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OUTLINES  
OF  
MATERIA MEDICA  
AND  
PHARMACOLOGY

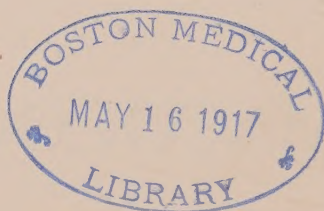
A TEXT-BOOK FOR STUDENTS

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## PREFACE.

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THIS book is the outgrowth of work arranged in 1893 for medical students at the University of Minnesota, under the title of "Outlines of Materia Medica." It is intended that it shall serve the purpose of a text-book; for use in the study of materia medica; to facilitate note-taking in the lecture-room; and to aid in the laboratory study of drugs.

The metric system has been given precedence over the old, or apothecaries', system of weights and measures, in designating doses.

While there are but few references throughout the book, the author has no wish to be credited with the original work belonging to others. A bibliography is therefore appended.

The author wishes to express thanks for many useful suggestions from the following members of the medical faculty in the University of Minnesota: Charles J. Bell, A.B., Professor of Chemistry; Thomas G. Lee, M.D., Professor of Embryology, and Histology; R. O. Beard, M.D., Professor of Physiology, and J. Clark Stewart, M.D., Professor of Pathology.

H. M. BRACKEN, M.D.

MINNEAPOLIS, August 10th, 1895.

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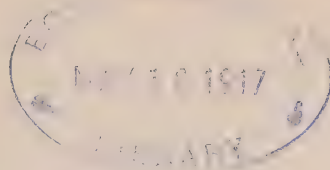
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# OUTLINES

OF

## MATERIA MEDICA AND PHARMACOLOGY.

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### PART I.

#### INTRODUCTION.

MATERIA MEDICA, from the physician's standpoint, has to deal with substances employed in the prevention and treatment of disease.

**Pharmacognosy** is that branch of materia medica which treats of the origin, characteristics, and composition of drugs.

**Pharmaco-dynamics**, or pharmacology, treats of the action of drugs upon the living organism.

**Therapeutics** is the term applied to the use of drugs, or other agents, for the preservation or recovery of health.

**Toxicology** is that branch of medicine which treats of poisons and their antidotes, and of the effects of excessive doses of medicines.

**Pharmacy** is the term applied to the practice of preparing, preserving, and compounding medicines, and of dispensing them according to the formulæ, or prescriptions, of medical practitioners.

**Preparations** described in a work on materia medica are divided into two great classes: The official, and the non-official. Official preparations are those recognized by the various Pharmacopœias. A Pharmacopœia is a book of formulæ, or directions for the preparation, etc., of medicines. In most foreign countries it is authorized by government. In the United States it has no legal standing, but is by common consent the recognized standard. This work is issued at regular intervals, in the United States every ten years. The seventh decennial revision of the United States Pharmacopœia (1890) is the one now in force. With each revision of the Pharmacopœia new drugs and preparations which have stood the test of time are added, while some of the old preparations which have proven useless or impracticable may be dropped. Other changes, such as form, names, etc., may be made.

The following articles were added to the Pharmacopœia of 1890:

Acetanilidum.	Hydrastininæ Hydrochloras.
ACIDUM	Hyoscinæ Hydrobromas.
Hypophosphorosum Dilutum.	Hyoscyaminæ Hydrobromas.
Stearicum.	Lithii Citras Effervescens.
Adeps Lanæ Hydrosus.	Menthol.
ALCOHOL	Methyl Salicylas.
Absolutum.	Naphtalinum.
Deodoratum.	Naphtol.
Aloe Barbadensis.	Oleatum Zinci.
Aloinum.	OLEUM
AQUA	Betulæ Volatile.
Aurantii Florum (diluted).	Cadinum.
Chloroformi.	Terebinthinæ Rectificatum.
Hydrogenii Dioxidi.	Pancreatinum.
Rosæ (diluted).	Paraldehydum.
Aspidosperma.	Pepsinum.
Barii Dioxidum.	PETROLATUM
CAFFEINA	Liquidum.
Citrata.	Spissum.
Citrata Effervescens.	Physostigminæ Sulphas.
Calcii Sulphas Exsiccatus.	PILULÆ
Cinnamomum Saigonicum.	Catharticæ Vegetabiles.
Cocainæ Hydrochloras.	Ferri Carbonatis.
Convallaria.	Potassii Citras Effervescens.
Elastica.	Pyrogallol.
ELIXIR	Resorcinum.
Aromaticum.	Rhamnus Purshiana.
Phosphori.	Salol.
Eriodictyon.	Sodii Nitris.
Eucalyptol.	Sparteinae Sulphas.
EXTRACTUM	SPIRITUS
Apocyni Fluidum.	Amygdalæ Amaræ.
Asclepiadis Fluidum.	Aurantii Compositus.
Aspidospermatis Fluidum.	Glonoini.
Cimicifugæ.	Phosphori.
Convallariæ Fluidum.	STRONTII
Eriodictyi Fluidum.	Bromidum.
Jalapæ.	Iodidum.
Lappæ Fluidum.	Lactas.
Menispermii Fluidum.	Strophanthus.
Phytolaccæ Fluidum.	Suppositoria Glycerini.
Rhamni Purshianæ Fluidum.	Terebenum.
Scoparii Fluidum.	Terpini Hydras.
Uvæ Ursi.	TINCTURA
Viburni Opuli Fluidum.	Lactucarii.
Ferri et Quininæ Citras Solubilis.	Quillajæ.
GLYCERITUM	Strophanthi.
Acidi Carbolic.	Trochisci Santonini.
Acidi Tannici.	Viburnum Opulus.
Boroglycerini.	Zea.
Hydrastis.	

The following articles were dropped from the Pharmacopœia in 1890 :

ABSTRACTUM	LINIMENTUM
Aconiti,	Cantharidis,
Belladonnæ,	Plumbi Subacetatis.
Conii,	LIQUOR
Digitalis.	Ferri et Quininae Citratis.
Hyoscyami,	Gutta-Perchæ,
Ignatiæ,	Pepsini.
Jalapæ,	Magnesiæ Sulphas.
Nucis Vomicæ.	Magnolia,
Podophylli,	Maltum.
Senegæ,	MISTURA
Valerianæ.	Magnesiæ et Asafoetidæ.
ACETUM	Potasii Citratis.
Lobeliæ,	Mucilago Cydonii.
Sanguinariæ.	OLEUM
Æther.	Lavandulæ.
AMMONII	Rutæ,
Phosphas.	Succini,
Sulphas.	Valerianæ.
Amylum Iodatum.	Origanum.
Aurantii Flores.	PILULÆ
Azedarach.	Ferri Compositæ.
Cannabis Americana.	Galbani Compositæ.
CERATUM	Pix Canadensis.
Extracti Cantharidis.	POTASSII
Sabinæ.	Sulphis.
Charta Cantharidis.	Tartras.
Chinoidinum.	Prinos.
Chloroformum Venale.	Rosmarinus.
Cinchona Flava.	Salix.
Cornus.	SODII
Cupri Acetas.	Bicarbonas Venalis.
Cydonium.	Santoninas.
Elixir Aurantii.	Spiritus Odoratus.
EMPLASTRUM	SYRUPUS
Ammoniaci.	Ferri Bromidi.
Asafoetidæ.	Limonis.
Galbani.	Thuja.
Picis Canadensis.	TINCTURA
EXTRACTUM	Conii.
Cornus Fluidum.	Ignatiæ.
Lactucarii Fluidum.	TROCHISCI
Malti.	Magnesiæ.
Mezerei.	Sodii Santoninatis.
Fel Bovis Inspissatum.	UNGUENTUM
Ferri Oxalas.	Acidi Gallici.
Galbanum.	Mezerei.
Gaultheria.	Sulphuris Alkalinum.
Gutta-Percha.	Ustilago.
Hydrargyri Sulphidum Rubrum.	VINUM
Ignatia.	Album Fortius.
Infusum Brayeræ.	Aloes.
Juniperus.	Rhei.
Lavandula.	Viola Tricolor.

The following changes of Official Latin Titles were made in the last revision of the U. S. Pharmacopœia:

## PHARMACOPŒIA 1880.

Acidum Arseniosum.  
 Æther Fortior.  
 Aloe.  
 Aluminii Hydras.  
 Aluminii Sulphas.  
 Aqua Aurantii Florum.  
 Aqua Creasoti.  
 Aqua Rosæ.  
 Arsenii Iodidum.  
 Brayera.  
 Chloroformum Purificatum.  
 Cinnamomum.  
 Cinnamomum.  
 Collodium cum Cantharide.  
 Creasotum.  
 Erythroxylin.  
 Emplastrum Picis cum Cantharide.  
 Extractum Aloes Aquosum.  
 Extractum Belladonnæ Alcoholicum.  
 Extractum Belladonnæ Fluidum.  
 Extractum Brayeræ Fluidum.  
 Extractum Conii Alcoholicum.  
 Extractum Erythroxyli Fluidum.  
 Extractum Hyoscyami Alcoholicum.  
 Extractum Sarsaparillæ Compositum Fluidum.  
 Extractum Stramonii.  
 Extractum Stramonii Fluidum.  
 Extractum Viburni Fluidum.  
 Ferri Phosphas.  
 Ferri Pyrophosphas.  
 Ferri Sulphas Præcipitatus.  
 Gossypium.  
 Hydrargyri Iodidum Viride.  
 Liquor Acidi Arseniosi.  
 Liquor Arsenii et Hydrargyri Iodidi.  
 Liquor Sodii Arseniatis.  
 Magnesii Citras Granulatus.  
 Mangani Oxidum Nigrum.  
 Mistura Ammoniaci.  
 Mistura Amygdalæ.  
 Mistura Asafetidæ.  
 Mistura Chloroformi.  
 Mistura Ferri et Ammonii Acetatis.  
 Oleum Bergami.

## PHARMACOPŒIA 1890.

Acidum Arsenosum.  
 Æther.  
 Aloe Scotrina.  
 Alumini Hydras.  
 Alumini Sulphas.  
 Aqua Aurantii Florum Fortior.  
 Aqua Creasoti.  
 Aqua Rosæ Fortior.  
 Arseni Iodidum.  
 Cusso.  
 Chloroformum.  
 Cinnamomum Cassia.  
 Cinnamomum Zeylanicum.  
 Collodium Cantharidatum.  
 Creosotum.  
 Coca.  
 Emplastrum Picis Cantharidatum.  
 Extractum Aloes.  
 Extractum Belladonnæ Foliorum Alcoholicum.  
 Extractum Belladonnæ Radicis Fluidum.  
 Extractum Cusso Fluidum.  
 Extractum Conii.  
 Extractum Cocæ Fluidum.  
 Extractum Hyoscyami.  
 Extractum Sarsaparillæ Fluidum Compositum.  
 Extractum Stramonii Seminis.  
 Extractum Stramonii Seminis Fluidum.  
 Extractum Viburni Prunifolii Fluidum.  
 Ferri Phosphas Solubilis.  
 Ferri Pyrophosphas Solubilis.  
 Ferri Sulphas Granulatus.  
 Gossypium Purificatum.  
 Hydrargyri Iodidum Flavum.  
 Liquor Acidi Arsenosi.  
 Liquor Arseni et Hydrargyri Iodidi.  
 Liquor Sodii Arsenatis.  
 Magnesii Citras Effervescens.  
 Mangani Dioxidum.  
 Emulsum Ammoniaci.  
 Emulsum Amygdalæ.  
 Emulsum Asafetidæ.  
 Emulsum Chloroformi.  
 Liquor Ferri et Ammonii Acetatis.  
 Oleum Bergamottæ.



## PHARMACOPŒIA 1880.

Oleum Theobromæ.  
 Opium Denarcotisatum.  
 Petrolatum (in part).  
 Phytolacæ Bacca.  
 Quillaia.  
 Sapo Viridis.  
 Sodii Arsenias.  
 Tinctura Belladonnæ.  
 Tinctura Colchici.  
 Tinctura Opii Deodorata.  
 Tinctura Saponis Viridis.  
 Tinctura Stramonii.  
 Viburnum.

## PHARMACOPŒIA 1890.

Oleum Theobromatis.  
 Opium Deodoratum.  
 Petrolatum Molle.  
 Phytolacæ Fructus.  
 Quillaja.  
 Sapo Mollis.  
 Sodii Arsenas.  
 Tinctura Belladonnæ Foliorum.  
 Tinctura Colchici Seminis.  
 Tinctura Opii Deodorati.  
 Linimentum Saponis Mollis.  
 Tinctura Stramonii Seminis.  
 Viburnum Prunifolium.

**Non-Official Preparations** are either new or unimportant preparations, or new synthetic preparations which are protected by proprietary rights, or special pharmacal preparations of official drugs. The non-official preparations are distinguished throughout this work by the Greek character  $\phi$ .

**The Naming of Preparations.**—This is one of the functions of the pharmacopœia. Latin is the accepted language, but the scientific and the vernacular English names are also given. Chemical nomenclature is adopted so far as possible. Thus, we say sodii nitras, lithii bromidum, plumbi oxidum; or in English, sodium nitrate, lithium bromide, lead oxide. In the case of the salts of iron and mercury, the endings *ous* and *ic* are used as means of distinction (ferrous, ferric; mercurous, mercuric). Still further, the distinguishing adjectives, *mild*, *corrosive*, *yellow*, or *red*, are used in titles of certain ones of the mercurial preparations—thus: mild mercurous chloride, corrosive mercuric chloride, yellow mercurous iodide, red mercuric iodide. In the naming of the so-called scale preparations of iron, which are not true chemical salts, but all of which contain iron in the ferric condition, the word **ferrum** is used to avoid giving the impression that they are definite double salts. With compounds having a well-known non-specific name, this is often adopted in preference to the chemical title: thus, we say **alum** instead of **potassio-aluminum-sulphate**. In the naming of crude vegetable drugs the botanical **genus** name is used as the official Latin title. A few old and well-known drugs, such as ipecacuanha, belladonna, etc., are exceptions to this rule. When there is but one part of the plant used the official Latin title, chosen according to the foregoing rule, is sufficient: thus, aconitum for aconitum radix. But if more than one part is used it must be named specifically; thus: arnicæ **flores**, arnicæ **radix** for arnica flowers and arnica root. The botanical genus name is quite generally used as the official English title also: thus, hyoscyamus is both the Latin and the English title for this

drug. Exception may be made to this rule when the vernacular name is derived from and is almost identical with the scientific name, or when long custom sanctions the vernacular name: thus, aloes instead of *aloe*, rhubarb instead of *rheum*.

In Latin titles where two nouns occur, or a noun and an adjective, the Latin order of sequence is followed: thus, leaves of belladonna is written *belladonna folia*. In the naming of pharmaceutical preparations the Latin order of sequence is not followed as regards the genus name: thus, tincture of aconite is not written **aconiti tinctura**, as Latin usage would naturally make it, but **tinctura aconiti**. Where adjectives occur, however, they are put in their proper Latin order, following the noun: thus, deodorized tincture of opium is written *tinctura opii deodorati*; fluid extract of gentian is written *extractum gentianæ fluidum*.

### THE WEIGHING AND MEASURING OF MEDICINES.

The weights and measures referred to by physicians in prescribing, and used by pharmacists in dispensing medicines, are, in the United States, the Apothecaries' Weights and Fluid Measures, and those of the Metric System.

The Apothecaries' Weights and Fluid Measures are the same as those used in England prior to 1825, the weights being originally derived from the Old English Troy Weight, and the Fluid Measures from the Wine Measure.

The French or Metric System is becoming standard in almost all of the enlightened countries. The *meter* (39 37 inches), the ten-millionth part of the quadrant of the earth, is the standard unit upon which the whole system is based.

#### APOTHECARIES' WEIGHT.

20 grains make 1 scruple.

60 grains, or 3 scruples, make 1 drachm.

480 grains, or 8 drachms, make 1 ounce.

The scruple is practically obsolete.

The signs used in designating units in apothecaries' weight are: gr. (always written with a small initial) denoting grain or grains; ℥, denoting drachm or drachms; and ℥, denoting ounce or ounces. The numerals indicating the number of weight-units to be taken are, when apothecaries' weight is employed, always to be placed *after* the sign or symbol designating the unit, and in Roman characters, thus: gr. x.; ℥ jss.; ℥ vj.

#### APOTHECARIES' FLUID MEASURE.

60 minims make 1 fluid drachm.

480 minims, or 8 fluid drachms, make 1 fluid ounce.

The signs used to designate these units are: ℥, denoting minim or minims; ℥, denoting fluid drachm or fluid drachms; and ℥, denoting

fluid ounce or fluid ounces. The quantities directed to be taken are indicated, in writing, by Roman numerals placed *after* the signs, thus: ℥ xxx, fʒ iv, fʒ viii.

### CUSTOMARY COMMERCIAL WEIGHTS AND MEASURES OF CAPACITY IN USE IN THE UNITED STATES.

#### The Commercial Weights are:

The pound (also called the avoirdupois pound), divided into 16 ounces, or into 7000 grains, each ounce thus containing 437.5 grains.

#### The Commercial Measures of Capacity for Liquids are:

The liquid gallon (also called the wine gallon), divided into 4 quarts, or 8 pints.

### THE METRIC TABLE OF WEIGHTS.

10 milligrammes make 1 centigramme.

100 milligrammes, or 10 centigrammes, make 1 decigramme.

1000 milligrammes, or 100 centigrammes, or 10 decigrammes, make 1 gramme.

The term **decigramme** is seldom used. The **gramme** (written Gm.), the weight of one-thousandth part of a liter (1 C.c.) of water at its maximum density, is the standard unit of weight.

The abbreviations for the gramme and its derivatives, with the equivalents in the apothecaries' weight, are as follows:

1 gramme,	written 1.	Gm., equals	15.43	grains.
1 decigramme,	"	.1 Gm.,	"	1.543 "
1 centigramme,	"	.01 Gm.,	"	.1543 "
1 milligramme,	"	.001 Gm.,	"	.01543 "

### THE METRIC TABLE OF CAPACITIES.

10 milliliters make 1 centiliter.

100 milliliters, or 10 centiliters, make 1 deciliter.

1000 milliliters, or 100 centiliters, or 10 deciliters make 1 liter.

These terms are seldom used. The **cubic centimeter** (written Cc.), which is the equivalent of one **milliliter**, is the standard unit of capacity.

In expressing quantities by weight or by measure in the metric system Arabic numerals are used, and are always placed *before* the terms or abbreviations designating the units, thus: 2.50 Gm., 30. Cc.

### RELATIONS BETWEEN THE VARIOUS UNITS OF WEIGHTS AND MEASURES IN USE.

1 fluid ounce	equals	Cc.	29.5737.
1 apothecaries' ounce	"	Gm.	31.10358.
1 avoirdupois (commercial) ounce	"	Gm.	28.3495.
1 gramme	"		15.43 grains.
1 cubic centimeter	"		16. minims.

### A COMPARISON OF THE WEIGHTS AND MEASURES SHOWS THE FOLLOWING:

Apothecaries' Weight.				Metric Weight.			
				GRAMMES.		GRAMMES.	
grain 1	equals, approximately,			0.06	or, exactly,	0.06480	
grains 15	equal	"		0.95	" "	0.97198	
$\frac{3}{4}$	1 equals	"		3.75	" "	3.888	
$\frac{3}{5}$	1	"	"	30.00	" "	31.103	
Apothecaries' Measure.				Metric Measure.			
				GRAMMES.		GRAMMES.	
minim 1	equals, approximately,			0.06	or, exactly,	0.0616	
minims 15	equal	"		0.95	" "	0.92	
$\frac{f3}{4}$	1 equals	"		3.75	" "	3.696	
$\frac{f3}{5}$	1	"	"	30.00	" "	29.276	

#### TO CONVERT APOTHECARIES' WEIGHTS TO METRIC WEIGHTS.

1. Reduce the quantity to grains, and divide by 15. The result will be expressed in grammes.
2. Reduce the quantity to drachms and multiply by 4. The result will be expressed in grammes.
3. Reduce the quantity to ounces and multiply by 30. The result will be expressed in grammes.

#### TO CONVERT METRIC WEIGHTS TO APOTHECARIES' WEIGHTS.

Reverse the above rules.

The advantages of the metric system over other systems of weighing or measuring are: (1) simplicity—the decimal system; (2) the possibility of its becoming the accepted system for weights and measures throughout the civilized world.

#### DOMESTIC WEIGHTS AND MEASURES.

Besides these authorized weights and measures are the **domestic measures**. These are as follows, and are extremely unreliable:

The drop,	supposed to be equal to 1 minim.
" teaspoon,	" " " " " 1 fluid drachm.
" dessert-spoon,	" " " " " 2 fluid drachms.
" table-spoon,	" " " " " 4 fluid drachms.
" wine glass,	" " " " " 2 fluid ounces.
" cup,	" " " " " 4 fluid ounces.
" tumbler,	" " " " " 8 fluid ounces.

The drop can hardly be called a measure, since its size depends not only upon the consistency of the fluid, but also upon the shape, surface,



area, and even position of the dropper. To show the difference in drops of different fluids under similar conditions, note the following comparison :

Chloroform	gives 180 to 276 drops for each fluid drachm.				
Tincture of Opium	"	106 to 147	"	"	"
Paregoric	"	95 to 110	"	"	"
Dil. Hydrocyanic Acid	"	45 to 50	"	"	"
Dil. Sulphuric Acid	"	49 to 54	"	"	"
Fowler's Solution	"	59 to 63	"	"	"

Measuring by drops, therefore, is only allowable when there is no danger from overdosage.

The spoons are uncertain measures, because of the faulty shape of the bowl for measuring purposes, and because of the difference in size of the spoons designated by the same name. There may be from six to nine teaspoonfuls to the ounce. The dessert-spoon is apt to contain more than two fluid drachms, and the tablespoon more than four fluid drachms.

Measuring glasses should take the place of these domestic measures. The best are conical glasses marked minims, teaspoon and tablespoon. Those shaped like a tumbler are too large at the base to measure small quantities accurately.

Medicines that have been carefully divided into accurate doses have an advantage over those that have to be measured in the above manner, hence the advantage, in many cases, of tablet triturates over liquid preparations.

#### SPECIFIC GRAVITY.

The specific gravity of liquids should be ascertained by means of a specific gravity bottle when accuracy is required. An accurate hydrometer is sufficient in ordinary practice, however. In accordance with the prevailing usage of modern chemical literature  $15^{\circ}\text{C}$ . ( $59^{\circ}\text{F}$ .) has been adopted as the standard temperature for the solubility of substances in liquids, for taking specific gravity, and for volumetric operations. When specific gravity is mentioned without a given temperature it is understood to refer to a temperature of  $15^{\circ}\text{C}$ . ( $59^{\circ}\text{F}$ .), as compared with water at the same temperature. In weighing solids it is very easy to convert from the Troy to the Metric Weight, or *vice versa*, but in weighing fluids some confusion arises because of the differences in specific gravity. A fluid drachm of water weighs 3.75 grammes, while the same volume of chloroform weighs 5.50 grammes, and of ether, 2.80 grammes. In prescribing when we wish to have the volume of any fluid drug equivalent to that of a given volume of water we must order by weight of

Spirits, tinctures, and oils . . .	$\frac{9}{10}$ , or $\frac{1}{10}$ less than of water.
Ether . . . . .	$\frac{3}{4}$ , or $\frac{1}{4}$ less " " "
Glycerin . . . . .	$\frac{5}{4}$ , or $\frac{1}{4}$ more " " "
Syrups . . . . .	$\frac{4}{3}$ , or $\frac{1}{3}$ more " " "
Chloroform . . . . .	$\frac{3}{2}$ , or $\frac{1}{2}$ more " " "

The differences which these computations involve are more apparent than real. Glycerin and syrups are the only fluids that cause much inconvenience, and with these, a little experience enables the prescriber to easily make the necessary allowance.

### TEMPERATURE.

When there is occasion to indicate the degree of temperature the scale of the centigrade thermometer, or in its absence Fahrenheit's thermometer, is to be used.

To reduce centigrade degrees to those of the Fahrenheit scale: multiply by nine, divide by five and add thirty-two, thus:  $20^{\circ}\text{C.} = \frac{9(20)}{5} + 32$ , or  $68^{\circ}\text{F.}$  To reduce Fahrenheit degrees to those of the centigrade scale: subtract thirty-two, multiply by five, and divide by nine, thus:  $95^{\circ}\text{F.} = \frac{5(95-32)}{9}$ , or  $35^{\circ}\text{C.}$  The following gives a comparative scale of centigrade and Fahrenheit degrees:

DEGREES.	
	C.   F.
Boiling point.	100   212
	95   203
	90   194
	85   185
	80   176
	75   167
	70   158
	65   149
	60   140
	55   131
	50   122
	45   113
	40   104
	35   95
	30   86
	25   77
	20   68
	15   59
	10   50
	5   41
Freezing point.	0   32
	— 5   23
	— 10   14
	— 15   5
	— 20   — 4
	— 25   — 13
	— 30   — 22
	— 35   — 31
	— 40   — 40

## OFFICIAL PREPARATIONS.

These may be conveniently described in alphabetical order.

**Aceta—Vinegars.** Two are official. These are solution of the active principles of certain drugs in dilute acetic acid. This dissolves some things that water will not, and the solutions keep fairly well, although not so well as alcoholic solutions. Each contains the soluble principles from ten per cent. of the drug.

**Alkaloidea—Alkaloids.** These are natural principles existing in plants, or animal tissues, and extracted therefrom by chemical process. They are organic bases, forming salts with acids, and regarded as compound ammonias, products of albuminous decomposition in the plant or animal cells during the process of growth. In nomenclature they are distinguished by their endings: in Latin, *ina*; in English, *ine*.

In animal tissues the decomposition of albuminous matter, during the normal processes of waste, produce alkaloids, called *Leucomaines*. The alkaloids produced by putrefaction are known as *Ptomaines*.

Alkaloids are generally used in the form of their salts, which are more soluble than the alkaloids themselves. "As remedies they may be termed *arms of precision*, and, compared with the tinctures, extracts, etc., of the pharmacopœia, are as the modern rifle to the ancient blunderbuss."

**Aquæ—Waters.** Thirteen are official. These are solutions of volatile principles in water. Most of the waters are now made by direct solution of the volatile oil, instead of by distillation of the aromatic herbs. Waters are chiefly used as vehicles.

**Cerata—Cerates.** Six are official. These are ointments, containing wax. They are firmer than ordinary ointments, and softer than plasters. They do not melt below 40° C. (104° F.).

**Chartæ—Papers.** Two are official. These are papers medicated by impregnation with, or by coating with, medicinal substances.

**Collodia—Collodions.** Four are official. These are liquid preparations having for their base a solution of gun-cotton in a mixture of alcohol and ether.

**Confectiones—Confections.** Electuaries. Conserves. Two are official. These are soft pastes which contain the drug mixed with honey or sugar.

**Decocta—Decoctions.** Two are official. These are made from a vegetable drug by boiling it in water from fifteen to thirty minutes, and then straining the product while hot. Unless otherwise directed they should contain 5 per cent. of the crude drug. (Compare with *infusa*.)

**Elixira—Elixirs.** Two are official. These are aromatic, sweetened preparations, containing active medicinal agents in small quantity, and made with a menstruum containing 25 per cent. of deodorized alcohol.

While there are but two elixirs that are official, there are a great many non-official elixirs. They are the outgrowth of the pharmacist's efforts to make medicine more palatable.

**Emplastra—Plasters.** Thirteen are official. These consist of adhesive substances spread upon cloth or leather, and intended to adhere to the part to which they are applied.

**Emulsa—Emulsions.** Four are official. These are a new class of preparations and have been introduced in place of certain liquid preparations formerly called "Mistura," which are, properly speaking, emulsions.

**Extracta—Extracts.** Thirty-four are official. These are solid or semi-solid preparations obtained by evaporating solutions of vegetable principles. 10 per cent. glycerin is sometimes added to the extracts to prevent their becoming too dry.

**Extracta Fluida—Fluid Extracts.** Eighty-eight are official. These are made like the extracts except that evaporation is not carried so far. They are of uniform strength and should represent in measure the virtues of the corresponding weight of the crude drug. Glycerin or alcohol is often added for preservative effect.

**Glucosideæ—Glucosides.** These are organic compounds belonging to the group of natural principles which exist in plants, and are capable of being decomposed by acids, alkalies, or ferments, in the presence of water, into glucose and a second substance which is different in each instance.

**Glycerita—Glycerites.** Six are official. These are preparations with glycerin as the solvent.

**Infusa—Infusions.** Four are official. Prepared by pouring hot or cold water upon the crude vegetable drug, and after allowing it to stand a short time, straining. Unless otherwise directed they should contain 5 per cent. of the crude drug. Boiling is not allowed, thus differing from *decocta*, q. v.

**Linimenta—Liniments.** Nine are official. These are liquid—generally soapy or oily—preparations for external use.

**Liquores—Solutions.** Twenty-four are official. Preparations in which an active, non-volatile principle is dissolved in water either alone or with the aid of other solvents. (Compare with *aquæ*.)

**Massæ—Masses.** Three are official. These have the active ingredients and the excipient mixed together to a consistence suitable for making pills.

**Mellita—Honeys.** One is official. These differ from syrups in having honey instead of sugar as a base.

**Misturæ—Mixtures.** Four are official. These are aqueous preparations in which one or more medicinal substances are held in suspension by the aid of gum or other viscid substance. (Compare with *liquores*.)



**Mucilagines—Mucilages.** Four are official. These are solutions of gum in water, obtained by dissolving gum, or by extracting with water the mucilaginous principles from certain plants.

**Olea—Oils.** These are divided into the volatile and the non-volatile or fixed oils. The volatile oils are obtained by distilling over a certain volatile principle from vegetable products. Occasionally a volatile oil may be obtained by expression. Example: Oil of lemon. The fixed oils are obtained by expression.

**Oleata—Oleates.** Three are official. These are solutions of metallic salts, or of alkaloids, in oleic acid.

**Oleoresinæ—Oleoresins.** Six are official. These are practically ethereal extracts, consisting principally of natural oils and resins extracted from vegetable drugs by means of ether. They are the most concentrated of the liquid preparations of drugs. (Compare with extracta.)

**Pilulæ—Pills.** Fifteen are official. These are small round masses composed of medicinal agents, and intended to be swallowed.

**Pulveres—Powders.** Nine are official. The simplest form is the crude drug reduced to a fine powder. The fineness of a powder is usually expressed by the number of meshes to a linear inch in the sieve through which it has been passed.

The official powders contain two or more substances triturated together.

**Resinæ—Resins.** Five are official. These are brittle amorphous solids obtained by precipitating the resinous principles of plants from their alcoholic solution by the agency of water. Resins consist of an acid, or a mixture of acids formed by the oxidation of terpenes (volatile hydrocarbons having the formulæ  $C_{10}H_{16}$ ). They are soluble in alcohol, but insoluble in water.

**Spiritus—Spirits.** Twenty-five are official. These are alcoholic solutions of volatile substances. (Compare with tincturæ.)

**Suppositoria—Suppositories.** One is official. Conical masses consisting of medicinal substances incorporated with cacao butter (oleum theobromatis), and intended for introduction into the rectum, vagina, or urethra. Those for insertion into the rectum usually weigh about 15 grains or 1 gramme. They liquefy at the body temperature. Small suppositories for introduction into the urethra are called medicated bougies.

**Syrupi—Syrups.** Thirty-two are official. These are concentrated solutions of sugar in water, containing medicinal substances. Many of them also contain flavoring or coloring matters.

**Tincturæ—Tinctures.** Seventy-one are official. Alcoholic solutions of non-volatile medicinal substances. Exception, tincture of iodine.

**Tincturæ Herbarum Recentium + Tinctures of Fresh Herbs.** These tinctures are prepared by macerating 50 parts of the fresh herb with 100 parts of alcohol for 14 days; then expressing the liquid and filtering.

These are prepared when the drug, through drying, would lose its active properties.

**Triturationes—Triturates.** One is official. These are intimate mixtures of medicinal substances with sugar of milk, the product containing 10 per cent. of the drug.

**Trochisci—Troches.** Fifteen are official. These are small, flattened cakes consisting of medicinal substances incorporated with sugar, mucilage of tragacanth, etc. They are also called pastiles and lozenges.

**Unguenta—Ointments.** Twenty-two are official. These are soft admixtures of medicines with fatty substances, for external application.

**Vina—Wines.** Ten are official. These are made in the same way as tinctures, using white wine and alcohol instead of alcohol alone. They are more liable to spoil than are the tinctures.

There are many non-official preparations also in use. Some of these belong to the classified list of official preparations as regards form, while others have a form and name peculiar to themselves. The following is a partial list of important non-official preparations :

**Tablet Triturates.**—These are small, flattened discs, quite closely resembling a troche in shape, in which the medicament is thoroughly triturated with sugar of milk or some other excipient. They are to be used in the same way as pills, and have the advantages of exact dosage, ready solubility, convenience, elegance, and cheapness.

**Hypodermic Tablets.**—In these the medicament is compressed alone or in combination with some inert vehicle. In form they somewhat resemble the tablet triturates or troches, but are much smaller. They are for use in hypodermatic medication, and have, as advantages over solutions, exact dosage, freedom from chemical change, and convenience.

**Capsules** are small, elongated gelatine boxes with rounded ends. They dissolve readily in the stomach, setting their contents free. They are used for administering drugs in powder form.

#### ADMINISTRATION OF DRUGS.

The following are the most common methods of introducing drugs into the system :

**By the mouth** (internal medication). When not otherwise stated medicines are to be administered in this way.

**Hypodermatically.**—This is next in importance to internal medication. The remedy is introduced directly into the subcutaneous tissue through a sharp hollow needle. Absorption takes place quickly, and the effect of the drug thus administered is more prompt and more certain than that of any other means of medication. The solutions thus introduced into the system must be of a neutral reaction.

**Hypodermoclysis.**—This is not (strictly speaking) medication. It

consists in the injection hypodermatically of a large quantity of warm salt water ( $\frac{1}{10}$  per cent. of common salt in sterilized water) into the cellular tissue. It is used for the purpose of supplying fluid to the blood-vessels and tissues after severe hemorrhages, or excessive drain upon the watery elements of the body, as in cholera, etc. The usual seat for such injection is the flank, or the inner aspect of the thigh. The quantity of the fluid to be injected at one time is from one to three pints. The apparatus required is a hypodermatic needle and a fountain syringe.

**By inhalation.**—This is well illustrated in the use of anæsthetics. The extensive blood supply of the respiratory tract favors rapid absorption of volatile, respirable, medicinal substances.

**By inunction.**—This consists in the application of a drug, capable of absorption, to the unbroken skin. Such drug is usually in the form of an ointment, oleate, or liniment. Friction over the part anointed hastens absorption.

**By fumigation.**—This consists in volatilizing a drug by means of heat and compelling the drug in this volatilized state to be deposited upon a warm moist skin through which absorption will take place rapidly. It is especially applicable to the use of certain mercurials in the treatment of syphilis. For example, thirty grains of calomel may be placed on a water-bath over a spirit-lamp, the whole being put under a chair upon which the naked patient is seated. A blanket large enough to envelop the person completely is fastened tightly around the neck. The volatilized calomel is deposited upon the moist skin of the patient, who in this condition is wrapped in a warm flannel blanket and placed in bed.

**Rectal medication.**—By this means drugs are introduced into the rectum, in the form of suppositories, enemas, etc. Absorption takes place slowly.

**Enteroclysis.**—This is not necessarily medication. It consists in the injection of fluid well into the bowel (ten inches or more) by means of a soft rubber tube attached to an ordinary fountain syringe. The liquid in the syringe should have a temperature of  $43^{\circ}$  C. ( $110^{\circ}$  F.).

#### DOSAGE.

The quantity of a drug to be given at any one time is governed by the following conditions: (1) The effect sought for; immediate and temporary, or continuous. If for immediate effect—for example; to relieve pain—a sufficient quantity should be administered in a single dose. If the pain to be relieved is continuous in character, the drug given to control it must be repeated before the effect of the first dose has completely passed away. (2) The duration of the physiological effect of a single dose. This depends upon the rapidity of absorption, elimination, or destruction of the drug. (3) The nature of the drug, toxic or non-toxic. If toxic the

danger line must not be passed, even though the desired effect has not been secured.

Instead of repeating a given dose at long intervals, thus producing an irregular or intermittent effect, a smaller dose at more frequent intervals may be preferable. By this latter means we secure a more constant and equable action.

A dose is sometimes described (and wisely so) as a *daily* dose: that is, a proper quantity of the drug for use during a period of twenty-four hours. Such quantity can be divided into small, frequently-repeated doses, or larger doses at longer intervals, according to the fancy of the prescriber or the condition of the patient. The term *dose*, without further explanation, is applied to the quantity of a drug to be administered to an adult, by the mouth. The hypodermatic dose is half the quantity used **per orem**; while the dose **per rectum** is twice that required **per orem** to produce an equivalent effect.

Certain rules, such as the following, are in use for determining the size of dose for a child.

(1) **Clark's rule.**—In this 150 pounds is taken as the weight to govern the adult dose. With the weight of the child as numerator and 150 pounds as the denominator, the proper dose for any given child is found.

(2) **Cowling's rule.**—The age of the child at its next birthday is used as the numerator; 24 (adult age) as the denominator. This fraction represents the child's dose.

(3) **Young's rule.**—The present age of the child is taken for the numerator; the age plus twelve serves as the denominator. This fraction represents the child's dose.

### PREScription WRITING.

A prescription is a statement, usually written, of the medicines or remedies to be used by a patient, and the manner of using them. A written prescription consists of from five to seven parts, as follows:

- (1) Name of patient.
- (2) Heading.
- (3) The names and quantities of ingredients.
- (4) Directions to the compounder or pharmacist.
- (5) Directions for the use of the remedies by the patient.
- (6) Date of prescription and signature of the physician.
- (7) Special directions to the pharmacist relating to the prescription.

Writing the name of a patient upon a prescription should insure its use by the one for whom it is intended. This is especially necessary where there is more than one patient in the same family. The heading of a prescription (**R**) is a combination of the initial, **R**, for **recipi**—imperative



of **recipio**—take, and the zodiacal sign for the planet Jupiter. In early days the prescriber was supposed to offer a prayer to Jupiter. With the increased demands upon the prescriber there was not time for a prayer for each prescription; only a sign to represent the prayer. As time became still more precious even the sign was abbreviated to its present form on the letter R. The heading thus represents a command and a prayer.

The names and quantities of the ingredients of a prescription are an important part of the prescription. The old rule for the drugs prescribed was that they should cure quickly, safely, and pleasantly; *curare cito, tute et jucunde*. Many prescriptions contain four ingredients, which are known as

- (1) The *basis*, or substance which is to cure.
- (2) The *adjuvant*, or substance which is to help cure.
- (3) The *corrective*, or substance which is to prevent any bad effects.
- (4) The *vehicle*, which makes it pleasant to take.

Having determined what these four ingredients shall be, the next thing to settle is the amount for each ingredient. To do this we must decide how long we wish the medicine to last, how many doses we wish to give, and the total bulk of each dose. Next we determine the quantity of each ingredient for each dose, and multiplying this quantity by the number of doses, we get the total amount for each ingredient. This we represent opposite the ingredients named, by means of symbols and numbers. In combining these ingredients we must bear in mind their chemical properties.

It is not necessary that every prescription should contain four ingredients. It may contain but one, the basis. And again, we may use more than four ingredients. We may combine two or more drugs having a similar action, to make the basis, with the idea that such combination will produce a better effect than any single one of its ingredients could.

Having determined what drugs, and the amount of each that our prescription must contain, we tell the pharmacist what he is to do with them, and what the patient is to do. After the pharmacist has prepared the prescription, he labels it with the directions given him for the patient.

The date of the prescription is necessary for the purpose of future reference, and the name of the prescriber must be attached to give authority for the prescription.

Special directions are not always necessary on a prescription, but at times it may seem wise to direct that the prescription is "not to be repeated," etc.

The language of the body of the prescription is, by common usage, Latin, and a certain amount of knowledge of Latin is necessary to the prescriber. The directions to the pharmacist may also be written in Latin, but that is at the option of the prescriber. The directions for the

patient should be written in the language of the country, or of the people, where it is to be used.

Prescriptions may be simple or compound: Simple when they contain but a single active ingredient; compound when they contain two or more active ingredients. Some of the compound prescriptions are really simple because, while actually containing two or more active ingredients, they have a common action. Other compound prescriptions are of the nature of "shot gun" prescriptions; that is, they contain several active ingredients with as great a variety of action. These are a disgrace to the prescriber, for they indicate that he is not sure what disease he is dealing with and therefore must use several drugs in order that one may accomplish some good should the others fail. The so-called patent medicines are generally of the "shot gun" type of prescription. Single medication with a definite object in view is ideal medication.

Abbreviations of Latin titles used in prescription writing are to be discouraged. They may indicate an ignorance of Latin on the part of the prescriber; they also confuse the compounder and increase the chances for error.

#### A FEW COMMON LATIN WORDS USED IN PRESCRIPTION WRITING.

##### Verbs—Imperative Mood.

<i>Addē</i> . . . . .	Add.
<i>Cola</i> . . . . .	Strain.
<i>Da</i> . . . . .	Give.
<i>Divide</i> . . . . .	Divide.
<i>Extende</i> . . . . .	Spread.
<i>Fac</i> . . . . .	Make.
<i>Filtra</i> . . . . .	Filter.
<i>Macera</i> . . . . .	Macerate.
<i>Misce</i> . . . . .	Mix.
<i>Recipe</i> . . . . .	Take.
<i>Signa</i> . . . . .	Write.
<i>Solve</i> . . . . .	Dissolve.
<i>Tere</i> . . . . .	Rub.

##### Verbs—Subjunctive Mood.

<i>Bulliat</i> . . . . .	Let (it) boil.
<i>Capiat</i> . . . . .	Let (him) take.
<i>Coletur</i> . . . . .	Let (it) be strained.
<i>Detur</i> . . . . .	Let (it) be given.
<i>Dividatur</i> . . . . .	Let (it) be divided.
<i>Fiat</i> . . . . .	Let (it) be made.
<i>Fiant</i> . . . . .	Let (them) be made.
<i>Sit</i> . . . . .	Let (it) be.
<i>Sumatur</i> . . . . .	Let (it) be taken.

## Participles or Verbal Adjectives.

<i>Adhibendus-a-um</i> . . . . .	To be administered.
<i>Dividendus-a-um</i> . . . . .	To be divided.
<i>Sumendus-a-um</i> . . . . .	To be taken.

## Prepositions.

<i>Ad</i> . . . . .	To, up to.
<i>Cum</i> . . . . .	With.
<i>In</i> . . . . .	Into.
<i>Pro</i> . . . . .	For.
<i>Sine</i> . . . . .	Without.
<i>Supra</i> . . . . .	Upon.

## Unclassified Words and Phrases.

<i>Bene</i> . . . . .	Well.
<i>Bis</i> . . . . .	Twice.
<i>Congius</i> . . . . .	A gallon.
<i>Dein</i> . . . . .	Thereupon.
<i>Et</i> . . . . .	And.
<i>Gradatim</i> . . . . .	Gradually.
<i>Guttatim</i> . . . . .	By drops.
<i>Non</i> . . . . .	Not.
<i>Numero</i> . . . . .	To the number of.
<i>Numerus</i> . . . . .	Number.
<i>Octarius</i> . . . . .	A pint.
<i>Quater</i> . . . . .	Four times.
<i>Semel</i> . . . . .	Once.
<i>Semissis</i> . . . . .	A half.
<i>Simul</i> . . . . .	Together.
<i>Statim</i> . . . . .	At once.
<i>Ter</i> . . . . .	Thrice.
<i>Ad saturandum</i> . . . . .	To saturation.
<i>In dies</i> . . . . .	Daily.
<i>In partes æquales</i> . . . . .	Into equal parts.
<i>Non repetatur</i> . . . . .	Not to be repeated.
<i>Pro re nata</i> . . . . .	According to need.
<i>Quantum sufficiat</i> . . . . .	As much as may be necessary.
<i>Redactus in pulverem</i> . . . . .	Let be pulverized.
<i>Secundum artem</i> . . . . .	According to rule.

## PHYSIOLOGICAL ACTION.

A knowledge of the physiological action of drugs is the basis upon which their intelligent use in the treatment of disease is founded. With this knowledge we have a definite object in view in prescribing; without it we are mere empiricists. It is this knowledge that divides therapeutics into two classes, viz.: **rational** and **empirical**. In rational therapeutics we use a given remedy to remove or control a diseased condition, because we recognize the cause and know that the physiological action of certain remedies will remove the cause. In empirical therapeutics there need be

no knowledge of the cause of disease. It is only necessary to know that certain conditions have been found, by experience, to disappear when certain remedies have been used. Empirical therapeutics is well illustrated in "domestic" practice. There need be neither physiological nor pathological knowledge.

The physiological action of a drug may be described as **local**: the anæsthetic action of cocaine. **Remote**: the irritation of the kidneys that may be produced during elimination through them of certain drugs. **Direct**: the paralyzing action of curare upon motor nerves. **Indirect**: the convulsions which may occur in poisoning from curare as a result of paralysis of the muscles of respiration and consequent asphyxia. **Primary**: the immediate effect of a dose of morphine; rest, sleep, absence of pain, etc. **Secondary**: the so-called after-effects of morphine; headache, nausea, etc. **Selective**: a drug thus acts only on certain structures although carried equally to all parts of the body. **Cumulative**: a sudden explosion of drug action where the elimination of a drug used continuously has not kept pace with the absorption.

There may be certain conditions which modify the physiological action of a drug. Thus **idiosyncrasy**, as shown by the unpleasant symptoms that may appear in some individuals after the administration of small, medicinal doses of quinine. **Tolerance**, as shown by the necessary increase in the quantity required of certain drugs to keep up a uniform effect when their use is continued for some time. **Disease**.—A drug dose that would produce a decided effect in health, may have little or no effect when certain diseased conditions exist, **Antagonism**.—Drugs may be chemically or physiologically antagonistic to each other. Such drugs should never be prescribed together.

#### CLASSIFICATION OF DRUGS ACCORDING TO ACTION.

For convenience drugs may be described according to their action as follows:

**Abortifacients**.—Drugs capable of producing premature child-birth.

**Absorbents**.—Drugs that may secure the absorption of exudates or of diseased tissues.

**Alteratives**.—Agents which overcome certain morbid processes by modifying nutrition.

**Anæsthetics**.—Agents which produce insensibility to pain.

**Analgesics**.—Agents which relieve pain by lessening the excitability of nerves or of nerve centres.

**Anaphrodisiacs**.—Agents which lessen sexual excitement.

**Anodynes**.—Agents which relieve pain by lessening the excitability of nerves or of nerve centres; more pronounced in their action than are analgesics.

**Antacids.**—Agents which counteract, or lessen, acidity.

**Antagonists.**—Agents acting in direct opposition to each other.

**Anthelmintics.**—Agents which destroy (vermicides), or expel (vermifuges), worms inhabiting the intestinal canal.

**Antiemetics.**—Agents which tend to prevent vomiting.

**Antihydrotics** (or anhidrotics).—Agents which lessen the secretion of sweat.

**Antiperiodics.**—Agents which lessen the severity, or prevent the return of certain periodic diseases.

**Antiphlogistics.**—Agents which tend to arrest inflammatory processes.

**Antipyretics.**—Agents which reduce body temperature in febrile conditions.

**Antiseptics.**—See Antizymotics.

**Antisialics.**—Agents which lessen the secretion of saliva.

**Antispasmodics.**—Agents which prevent or arrest spasmodic action.

**Antisymphilitics.**—Remedies used for the relief of syphilis.

**Antizymotics.**—Agents which arrest or prevent fermentation. They include :

*Antiseptics.*—Agents which may prevent putrefaction.

*Disinfectants* (or Germicides).—Agents which destroy specific poisons.

**Aperients.**—Mild laxatives.

**Aphrodisiacs.**—Agents which stimulate sexual function.

**Aromatics.**—Remedies characterized by a fragrant or spicy taste and odor, and stimulant to the gastro-intestinal mucous membrane.

**Astringents.**—Agents which contract the tissues and diminish the calibre of vessels, thereby checking or diminishing slight hemorrhages or excessive discharges.

**Bitters.**—Remedies which by their bitter properties have the power of stimulating the secretions of the alimentary canal.

**Carminatives.**—Agents which aid the expulsion of gas from the stomach and intestines.

**Cathartics.**—See Purgatives.

**Caustics.**—Agents which destroy living tissue by burning (see counter-irritants).

**Cholagogues.**—Agents which increase the elimination of bile.

**Correctives** (Corrigents).—Agents used to correct, or render more pleasant, the action of other remedies.

**Counter-irritants.**—Substances which, if applied to human tissue, will cause increased vascular excitement, or even inflammation of the part, thus relieving pain, or pathological conditions, in another part.



They comprise :

*Caustics* (or Escharotics)—which destroy tissue and cause a slough to form.

*Epispastics* (or Vesicants)—which cause the formation of a blister.

*Pustulants*—which irritate isolated points, and cause the formation of pustules.

*Rubefacients*—which cause simply congestion or redness of the part.

**Demulcents.**—Mucilaginous principles which soothe and protect the part to which they are applied.

**Deodorants** (or Deodorizers).—Agents which destroy or mask disagreeable odors.

**Depilatories.**—Substances used to remove hair.

**Depressants.**—Agents which lessen vital activity.

**Depresso-motors.**—Remedies which lessen motor activity.

**Detergents.**—Agents used to cleanse wounds or ulcers.

**Diaphoretics** (or Sudorifics).—Remedies which produce sweating.

**Digestants.**—Ferments and acids which have the power of aiding in the solution of food.

**Diluents.**—Agents which dilute secretions and excretions.

**Disinfectants.**—See Antizymotics.

**Diuretics.**—Agents which increase the elimination of urine.

**Drastics.**—Purgatives which cause much intestinal irritation (see Purgatives).

**Ecbolics.**—Agents which produce abortion.

**Emetics.**—Agents which cause vomiting.

**Emmenagogues.**—Remedies which stimulate menstruation.

**Emollients.**—Substances used to mechanically soften and protect tissues.

**Escharotics.**—See Counter-irritants.

**Excitants.**—Agents which cause increased action in any part of a living organism.

**Excito-motors.**—Agents which increase motor activity.

**Expectorants.**—Remedies which act upon the bronchial secretion, increasing or diminishing the amount according to circumstances.

**Galactagogues.**—Agents which increase the secretion of milk.

**Germicides.**—See Antizymotics.

**Hæmostatics** (or Styptics).—Agents which arrest hemorrhages.

**Hydragogues.**—Remedies which cause watery stools; a term generally applied to one class of purgatives (see Purgatives).

**Hypnotics.**—Agents which cause sleep.

**Incompatibles.**—Agents which chemically or physiologically antagonize each other (see Antagonists).

**Laxatives.**—Mild purgatives (see Purgatives).

**Mydriatics.**—Agents which cause dilatation of the pupil.

**Myotics.**—Agents which cause contraction of the pupil.

**Narcotics.**—Powerful anodyne hypnotics.

**Oxytocics.**—Agents which stimulate uterine contractions.

**Palliatives.**—Agents which relieve, but do not cure.

**Prophylactics.**—Agents which prevent the taking, or development, of disease.

**Protectives.**—Agents used to cover and protect inflamed or injured parts.

**Purgatives** (Cathartics).—Agents which increase or hasten intestinal evacuation. They may be divided into six classes :

*Laxatives*—which increase but slightly the action of the bowels.

*Simple Purgatives.*—A little more active than laxatives.

*Drastic Purgatives*—which cause violent action, or even inflammation of the bowels.

*Saline Purgatives.*

*Hydragogue Cathartics*—which excite copious secretion from the intestinal mucous membrane.

*Cholagogues*—which increase the elimination of bile.

**Pustulants.**—See Counter-irritants.

**Refrigerants.**—Agents which relieve the sensation of heat.

**Rubefacients.**—See Counter-irritants.

**Sedatives.**—Agents which lower functional activity.

**Sialagogues.**—Agents which increase the flow of saliva.

**Soporifics** (Somnifacients).—Agents which cause sleep.

**Specifics.**—Agents which have a direct curative influence on certain individual diseases.

**Sternutatories.**—Agents which cause sneezing.

**Stimulants.**—Agents which increase functional activity.

**Stomachics.**—Agents which stimulate digestion.

**Styptics.**—See Hæmostatics.

**Sudorifics.**—Agents which produce profuse sweating.

**Synergists.**—Remedies which work together.

**Tonics.**—Medicines which permanently increase the systemic tone by stimulating nutrition.

**Vermicides.**—See Anthelmintics.

**Vermifuges.**—See Anthelmintics.

**Vesicants.**—See Epispastics, under Counter-irritants.

## PART II.

### THE ACIDS.

These are substances either solid, liquid or gaseous, possessing a sour taste, corrosive action, the property of turning blue litmus paper red, of destroying more or less completely the characteristic properties of alkalies, at the same time losing their own distinguishing characteristics and forming salts. The sour taste is not always present ; the property of reddening litmus is sometimes wanting.

**General Action of Acids.**—All the tissues of the body are alkaline. The first effect of acids is to neutralize this alkalinity of such tissues as they may come in contact with. Albumin if present is precipitated, but redissolved in an excess of acid, excepting nitric acid. The strong acids, acetic, hydrochloric, nitric, phosphoric, sulphuric, etc., have an irritant and caustic action due to their strong affinity for the water and the bases in the tissues. They form dry aseptic eschars. The vapors from the strong acids are irritant even to a dangerous degree. Many of the acids have an antiseptic action, but their irritant and destructive qualities prevent or limit their use for such action.

Very dilute solutions of acids sponged over the surface of the body produce a cooling sensation ; this is due to increased evaporation. Applied to a bleeding surface, they may check moderate hemorrhages by exciting the muscular coat of the arteries to contract ; by constringing the tissues ; and by hastening the coagulation of blood in the ends of the bleeding vessels.

In the mouth diluted acids produce a peculiar sensation due to their action upon the mucous membrane (constricting) and upon the teeth. They have a destructive action upon the teeth, decomposing the lime phosphate and other mineral constituents of the enamel. Acids stimulate the action of glands yielding an alkaline secretion. They retard acid secretion. In the circulation they diminish the alkalinity of the blood to a slight degree by combining with part of the alkaline constituents of the liquor sanguinis. They probably do not increase the acidity of normal urine, but alkaline urine may be changed to acid urine by the internal administration of the mineral acids. By their stimulating action upon

certain glands they may increase the total amount of solids excreted, and thus indirectly increase the action of the kidneys.

The vegetable acids have little, if any, of the action of an acid beyond the point of absorption unless given in large doses.

*Toxicology.*—The strong acids act as irritant poisons. The symptoms they produce are those of a corrosive; intense burning pain wherever the acid has come in contact with the mucous membrane, great thirst, a weak pulse, and dyspnœa. The patient may die from collapse due to perforation of the walls of the œsophagus or of the stomach, or as a result of the acute inflammation that is produced. If death does not occur before the third or fourth day, there may be acute inflammation of the kidneys, caused by the acid during the process of elimination. If the patient survives the acute stage he may die later from inanition, the result of stricture of the œsophagus, or of secondary changes in the stomach and intestines.

Treatment of poisoning from acids consists in the prompt use of suitable alkalis—sodium bicarbonate, or carbonate (baking or washing soda), soap and water, lime-water, chalk, tooth-powder, whitewash, magnesia, etc. Bland and protective drinks, such as milk, the white of egg with water, olive oil, etc., should also be used. The severe pain must be relieved by the judicious use of morphine hypodermatically. The later inflammatory symptoms must be treated according to circumstances.

#### ACIDUM NITRICUM.

**Nitric Acid.**—Aqua Fortis.

A liquid composed of 68 per cent., by weight, of absolute nitric acid ( $\text{HNO}_3$ ) and 32 per cent. of water. It should be kept in dark, amber-colored, glass-stoppered bottles.

A colorless, fuming liquid, very caustic and corrosive, having a peculiar, somewhat suffocating odor, and an intensely acid reaction. Sp. gr.: about 1.414 at 15° C.

Prepared from potassium nitrate, or sodium nitrate, by adding sulphuric acid and distilling the product.

#### PREPARATIONS.

Acidum Nitricum . . . . . For external use.

Acidum Nitricum Dilutum . . . . . 0.30–1.25 Cc.  $\mathcal{M}_{\text{V-XX}}$ .

**Diluted Nitric Acid** contains 10 per cent., by weight, of absolute nitric acid. Sp. gr.: about 1.050.

#### ACTION.

This has the general action of acids. See p. 32.

It is one of the best acid caustics because of its self-limiting properties through its action on albumin. In diluted form it is an hepatic stimulant.

## USE.

Locally, the concentrated or "fuming" nitric acid may be used to destroy warts, condylomata, the surface of foul, or sloughing ulcers; to arrest hospital gangrene or phagedenic ulcerations; to destroy the poison from the bite of a venomous reptile or of a rabid animal. Well diluted ( $\frac{1}{10}$  to 1 per cent.), it may be used as a general or as a local bath to increase the action of the sweat glands, or to reduce febrile temperature. In chronic cystitis it may be used by injection ( $\frac{1}{10}$  to  $\frac{1}{2}$  per cent.), especially when the urine is very ammoniacal.

Internally it may be used as an hepatic stimulant in so-called biliousness; as an adjunct in the treatment of malaria; in combination with bitters in the treatment of some forms of dyspepsia.

## ACIDUM HYDROCHLORICUM.

**Hydrochloric Acid.**—Muriatic Acid.

A liquid composed of 31.9 per cent., by weight, of absolute Hydrochloric Acid (HCl), and 68.1 per cent. of water. It should be kept in amber-colored, glass-stoppered bottles.

A colorless, fuming liquid, of a pungent odor, an intensely acid taste, and an acid reaction. Sp. gr.: about 1.163 at 15° C. Miscible, in all proportions, with water and alcohol.

Prepared by warming sodium chloride with sulphuric acid, washing the evolved HCl and conducting it into cold water, by which it is absorbed.

## PREPARATIONS.

Acidum Hydrochloricum, . . . 0.12–0.30 Cc. ℞ ij–v.

Acidum Hydrochloricum Dilutum, 0.30–1.25 Cc. ℞ v–xx.

**Diluted Hydrochloric Acid** contains 10 per cent. of absolute hydrochloric acid. Sp. gr 1.050.

## ACTION.

This has the general action of acids. See p. 32.

Hydrochloric acid is a normal constituent of the gastric juice, and is necessary to digestion. It is an hepatic stimulant. It is not astringent.

## USE.

Locally, well diluted ( $\frac{1}{10}$  to 1 per cent.), it may be used as a bath to increase the action of the sweat glands, also to reduce febrile temperature by favoring evaporation. The diluted acid may be used to dissolve inoperable bony sequestra.

Internally, it may be given after meals to supply a temporary deficiency of hydrochloric acid in the gastric juice, thus aiding digestion. It may be used to lessen phosphatic deposits in the urine. Also used, well diluted, to quench thirst in febrile conditions.



## ACIDUM NITROHYDROCHLORICUM.

**Nitrohydrochloric Acid.**—Nitro-Muriatic Acid. Aqua Regia.

A golden yellow, fuming, and very corrosive liquid, having a strong odor of chlorine. It readily dissolves goldleaf.

Prepared by mixing 180 Cc. of Nitric Acid and 820 Cc. of Hydrochloric Acid in a capacious glass vessel. When effervescence has ceased, pour the product into dark amber-colored, glass-stoppered bottles, which should not be more than half filled, and keep them in a cool place.

## PREPARATIONS.

Acidum Nitrohydrochloricum, . . . 0.18–0.36 Cc. ℥ij–vj.

Acidum Nitrohydrochloricum Dilutum, 0.30–1.25 Cc. ℥ v–xx.

**Diluted Nitrohydrochloric Acid** contains 40 Cc. of nitric acid, 180 Cc. of hydrochloric acid, and 780 Cc. of distilled water.

## ACTION.

This has the action of an hepatic stimulant to a greater degree than has either hydrochloric or nitric acid alone.

## USE.

The strong acid, *freshly prepared*, should be used in preference to the official diluted acid.

Internally it may be used in certain hepatic disturbances, as hepatic torpor, chronic hepatitis, biliousness, jaundice, etc. It is apt to cause bilious purging.

## ACIDUM SULPHURICUM.

**Sulphuric Acid.**—Oil of Vitriol.

A liquid composed of not less than 92.5 per cent., by weight, of absolute sulphuric acid ( $H_2SO_4$ ), and not more than 7.5 per cent. of water. It should be kept in glass-stoppered bottles.

It is colorless, of oily consistency, inodorous, very caustic and corrosive, with an intensely acid reaction. Sp. gr.: not below 1.835 at 15° C. Miscible, in all proportions, with water and alcohol, with the evolution of so much heat that the mixing requires great caution.

It is produced by the combustion of sulphur, with the oxidation and hydration of the resulting sulphur dioxide, by means of nitrous and aqueous vapors.

## PREPARATIONS.

Acidum Sulphuricum, . . . . . For external use.

Acidum Sulphuricum Dilutum, . . 0.30–1.25 Cc. ℥ v–xx.

Acidum Sulphuricum Aromaticum, 0.30–1.25 Cc. ℥ v–xx.

**Diluted Sulphuric Acid** contains 10 per cent., by weight, of absolute sulphuric acid. Sp. gr.: about 1.070 at 15° C.

**Aromatic Sulphuric Acid** contains about 10 per cent., by weight, of official sulphuric acid, partly in the form of ethyl-sulphuric acid. Sp. gr.: about 0.939 at 15° C.

#### ACTION.

This has the general action of acids. See p. 32.

The strong acid is a very painful and persistent caustic; diluted it has a more marked astringent action than have the other acids.

#### USE.

Well diluted ( $\frac{1}{2}$  to 1 per cent.), it is used in febrile conditions as an acid drink to allay thirst, and to relieve the dryness of the mouth and throat. For its astringent and antiseptic action it is used in typhoid fever; in certain forms of diarrhœa; as a prophylactic against cholera; etc. As a prophylactic against lead-poisoning, or in the treatment of chronic lead-poisoning, it is used for its chemical rather than physiological action, forming insoluble sulphates throughout the intestinal canal. It may be used in the night-sweating of phthisis.

The aromatic sulphuric acid is the most agreeable preparation for internal use.

#### ACIDUM PHOSPHORICUM.

##### Phosphoric Acid.

A liquid composed of not less than 85 per cent., by weight, of absolute Orthophosphoric Acid ( $H_3PO_4$ ), and not more than 15 per cent. of water. It should be kept in glass-stoppered bottles.

A colorless liquid, without odor, but having a strongly acid taste. Sp. gr.: not below 1.710 at 15° C. Miscible, in all proportions, with water or alcohol.

Prepared by oxidizing phosphorus, heating it in a mixture of nitric acid and water until nitrous fumes have ceased to form.

#### PREPARATIONS.

Acidum Phosphoricum . . . . . For pharmaceutical use.

Acidum Phosphoricum Dilutum . . . . 0.30-1.25 Cc.  $\mathfrak{M}$ v-xx.

**Diluted Phosphoric Acid** contains 10 per cent., by weight, of absolute Orthophosphoric Acid. Sp. gr.: about 1.057.

#### ACTION.

This acid is closely allied to hydrochloric acid in action. It has a pleasant flavor (resembling the fruit acids) and is well borne by the stomach. It does not increase nervous activity (thus differing from phos-

phorus), except indirectly by promoting digestion, and thus aiding in the assimilation of food.

#### USE.

Much after the manner of hydrochloric acid.

### ACIDUM HYPOPHOSPHOROSUM DILUTUM.

#### Diluted Hypophosphorous Acid.

This is a liquid compound of about 10 per cent., by weight, of absolute Hypophosphorous Acid ( $\text{HPH}_2\text{O}_3$ ) and about 90 per cent. of water. It is a colorless liquid, without odor, and having an acid taste. Sp. gr. : about 1.046 at  $15^\circ\text{C}$ . Miscible in all proportions with water.

Prepared from any one of the soluble hypophosphites.

#### ACTION.

This has the general action of acids. See p. 32. It is, however, never used alone as a therapeutic agent, but only in combination with the hypophosphites in the form of syrups or solutions. (See Hypophosphites.)

### ACIDUM ACETICUM GLACIALE. $\text{HC}_2\text{H}_3\text{O}_2$ .

#### Glacial Acetic Acid.

This is nearly, or quite, absolute acetic acid. At a temperature somewhat below  $15^\circ\text{C}$ . the acid becomes a crystalline solid. At higher temperature it is a colorless liquid, of a strong, vinegar-like odor, and a very pungent, purely acid taste.

It may be obtained by heating sodium acetate so as to drive off all its water of crystallization, and distilling the product with sulphuric acid.

#### PREPARATIONS.

Acidum Aceticum Glaciale . . . . . For external use.

Acidum Aceticum . . . . . For external use.

Acidum Aceticum Dilutum . . . . . 0.30–1.25 Cc.  $\text{M}_{\text{V-XX}}$ .

$\Phi$ Acetum (Vinegar).

**Acetic Acid** is a liquid composed of 36 per cent., by weight, of absolute Acetic Acid.

A clear, colorless liquid, having a strong, vinegar-like odor, a purely acid taste, and a strongly acid reaction. Sp. gr. : 1.048 at  $15^\circ$ . Miscible with alcohol and water in all proportions.

Obtained by purification of the crude acetic acid, a product of destructive distillation of wood.

**Diluted Acetic Acid** contains 6 per cent., by weight, of absolute Acetic Acid. Sp. gr. : 1.008 at  $15^\circ\text{C}$ .

**Vinegar** is an acid liquid, of a brown color, and peculiar odor. Obtained from fruits and grains by acetous fermentation, and containing from 3.5 to 5.5 per cent. of absolute Acetic Acid.

#### ACTION.

Glacial acetic acid is caustic. The vapor inhaled causes, through reflex action, contraction of the blood-vessels. The diluted acid used locally may check bleeding from small vessels, and may diminish the secretion of the sweat glands. By favoring surface evaporation it may also reduce body temperature.

#### USE.

Glacial acetic acid may be used locally to destroy warts, corns, etc. It may also be used in varying dilutions in certain skin diseases.

Acetic acid is used locally for similar action as that of the glacial acetic acid, bearing in mind simply the relative strength of the two acids.

The diluted acid may be used locally to check mild hemorrhages, to check sweating, etc.

#### ACIDUM HYDROCYANICUM DILUTUM.

**Diluted Hydrocyanic Acid.** Cyanhydric Acid. Prussic Acid.

It is a colorless liquid composed of 2 per cent., by weight, of absolute hydrocyanic acid (HCN) and 98 per cent. of water. It has the characteristic odor and taste of bitter almonds, and a slightly acid reaction. It is completely volatilized by heat and should be kept in small, dark, amber-colored, cork-stoppered vials, in a cool place.

It may be prepared from potassium ferrocyanide by adding sulphuric acid and distilling the product into water.

Dose, 0.12–0.30 Cc.  $\mathfrak{mij-v}$ .

#### ACTION.

Hydrocyanic acid differs from all other acids in having an action peculiarly its own. It is one of the most powerful and rapid poisons known, carbolic acid alone approaching it in the violence of its effects. It is volatile, hence it is quickly absorbed and as quickly eliminated. It destroys protoplasmic movements, checks oxidation and arrests fermentation. Applied to the skin it is absorbed, and paralyzes the ends of the sensory nerves, so that the part becomes numb. It is thus a local anæsthetic and sedative. It is quickly absorbed by mucous membranes and has the same local anæsthetic and sedative action upon them as upon the skin. Absorbed, its sedative action becomes general.

#### USE.

Locally it may be used (a 5 to 10 per cent. solution) for its sedative action in the treatment of certain skin diseases.

Internally it may be used as an antispasmodic in the treatment of whooping-cough, the irritable cough of the first stage of phthisis, hay asthma, etc.

### TOXICOLOGY.

Death may come *at once*, and this is due to sudden arrest of the heart. There is a characteristic cry, a gasp, convulsive movements, cyanosis, dilated pupils and clenched teeth. The odor of hydrocyanic acid may be present. With a smaller but still poisonous dose death comes more slowly and is due to paralysis of respiration. The symptoms may then be divided into three stages: (1) giddiness, difficult and irregular respiration, and irregular heart's action; (2) violent convulsions, dilated pupils, unconsciousness, relaxed sphincters, etc.; (3) asphyxia, complete insensibility, paralysis, an almost imperceptible pulse, and death due to paralysis of respiration. In the first stage of slow poisoning the arterial character of the blood extends into the veins, and this is due to dilatation of the peripheral vessels allowing the blood to pass through them rapidly without undergoing the usual changes. At the same time the arterial pressure suddenly falls. The power of the blood to give off oxygen is greatly diminished, and in the advanced stages of poisoning it assumes a more venous character than normal.

*Treatment.*—The use of strychnine as a cardiac and respiratory stimulant, hypodermatically. Other stimulants may be used when strychnine is not at hand. If the patient survive twenty or thirty minutes there is hope for recovery.

### POTASSII CYANIDUM. KCN.

#### Potassium Cyanide.

It occurs as white, opaque, amorphous pieces, or as a white, granular powder; odorless when perfectly dry, but in moist air exhaling the odor of hydrocyanic acid. The taste is sharp and somewhat alkaline, and the reaction strongly alkaline. It is deliquescent in damp air. Soluble in 2 parts of water at 15° C.; sparingly soluble in alcohol. It should be kept in well-stoppered bottles.

It may be obtained by heating potassium ferrocyanide at a red heat until gases cease to be evolved.

Dose: 0.003–0.005 Gm. gr.  $\frac{1}{20}$ – $\frac{1}{12}$ .

### ACTION.

This has an action similar to, but slower than, that of diluted hydrocyanic acid.

### USE.

When a more prolonged effect is wanted than the diluted hydrocyanic acid is capable of giving.



**ACIDUM CITRICUM.**  $\text{H}_3\text{C}_6\text{H}_5\text{O}_7 + \text{H}_2\text{O}$ .**Citric Acid.**

An organic acid, usually prepared from lemon juice.

It occurs in colorless, translucent prisms; odorless, having an agreeable, purely acid taste, and an acid reaction. Efflorescent in warm air, and deliquescent when exposed to moist air. Soluble at  $15^\circ \text{C}$ ., in 0.63 part of water, and in 1.61 parts of alcohol.

**PREPARATIONS.**

Acidum Citricum . . . . . 0.30–1.25 Gm. gr. v–xx.

Syrupus Acidi Citrici . . . . . 3.75–15.00 Cc.  $\text{ʒi}$ –iv.

**Syrup of Citric Acid** contains citric acid 10 Gm., and spirit of lemon 10 Cc. in 1000 Cc.

**ACTION.**

This acid has no marked caustic action, and its acid properties are quite limited, for it is decomposed in the blood and has the general action of the alkalies after absorption. Of large doses part may be eliminated unchanged by the intestinal canal; part by the kidneys. It may produce a certain amount of irritation along the lines of elimination, thus acting as a purgative or as a diuretic. It is also a decided antiscorbutic. Citric acid is the most agreeably flavored of the so-called organic acids. To it most of the acid edible fruits owe their acidity. A six per cent. aqueous solution is about the equivalent of good lemon juice as regards acidity.

**USE.**

Citric acid may be used locally in certain skin diseases. It is used internally both as a prophylactic and curative agent in the treatment of scurvy. In acute articular rheumatism 15 Gm. ( $\text{ʒiv}$ .) may be used every twenty-four hours or 90. to 150. Cc. ( $\text{ʒiii}$ –v) of lemon juice may take the place of such an amount of citric acid.

Citric acid (or lemon, or lime juice) makes an agreeable drink for fever patients. It may also be used to allay the thirst of diabetic patients.

**ACIDUM TARTARICUM.**  $\text{H}_2\text{C}_4\text{H}_4\text{O}_6$ .**Tartaric Acid.**

An organic acid, usually prepared from argol (crude tartar).

It occurs in colorless, translucent prisms, or in crystalline crusts, or as a white powder; odorless, having a purely acid taste, and an acid reaction. Permanent in the air. Soluble, at  $15^\circ \text{C}$ ., in 0.8 part of water and in 2.5 parts of alcohol.

Dose: 0.30–1.25 Gm. gr. v–xx.

## ACTION.

Tartaric acid has the general action of citric acid, but is more of an irritant. It is cheaper than citric acid, and, while not so desirable for therapeutic purposes, is often substituted for it.

## USE.

This should be limited to its pharmaceutical use in combination with potassium or sodium salts to produce effervescence.

## ACIDUM LACTICUM.

## Lactic Acid.

An organic acid, usually obtained by subjecting milk-sugar or grape-sugar, to lactic fermentation. Composed of 75 per cent., by weight, of absolute lactic acid ( $\text{HC}_3\text{H}_5\text{O}_3$ ), and 25 per cent. of water.

A colorless, syrupy liquid, odorless, of a purely acid taste, and a strongly acid reaction. Sp. gr. : about 1.213 at 15° C. It absorbs moisture on exposure to damp air, and is freely miscible with water, alcohol and ether.

## PREPARATIONS.

Acidum Lacticum . . . . . 0.30–1.25 Cc.  $\mathfrak{m}$ . v–xx.

Syrupus Calcis Lacto-phosphatis . . See the Lacto-phosphates.

## ACTION.

Lactic acid has a marked solvent action upon false membranes. It is also a mild caustic. It may aid digestion and prevent gastric fermentation much after the manner of hydrochloric acid, over which it has no advantages.

## USE.

As a caustic locally, in the treatment of various morbid growths. It was formerly much used to dissolve diphtheritic membrane.

Internally, in the treatment of some forms of infantile diarrhoea ("green diarrhoea") a two per cent. solution, of which eight to ten ounces is the daily dose, has been used with marked success. In the treatment of diabetes, with an exclusive meat diet it may be used as a conservator of tissues.

ACIDUM BORICUM.  $\text{H}_3\text{BO}_3$ .

## Boric Acid. Boracic Acid.

Dose : 0.30–1.25 Gm. gr. v–xx.

It occurs in transparent, colorless plates, slightly unctuous to the touch, permanent in the air, odorless, with a cooling, bitterish taste, and a feebly acid reaction. Soluble, at 15° C., in 25.6 parts of water, and in 15 parts of alcohol; also soluble in 10 parts of glycerin.

It may be prepared from sodium borate by decomposing that salt in aqueous solution with strong hydrochloric acid.

#### ACTION.

A mild unirritating antiseptic, not to be relied upon as a germicide. It is also a protectant, a detergent and an exsiccant.

#### USE.

It has a wide range of application when one or more of its properties are called for. Externally in the treatment of burns, wounds, ulcers, etc., as a dusting powder, ointment (10 to 25 per cent.) glycerine (glyceritum boroglycerine), or aqueous solution (1 to 4 per cent.).

Internally it may be used to prevent gastric fermentation. Being eliminated by the kidneys it may be used in cystitis to render the urine acid.

#### ACIDUM OLEICUM. $\text{HC}_{18}\text{H}_{33}\text{O}_2$ .

##### Oleic Acid.

An organic acid, prepared, in a sufficiently pure condition, by cooling commercial oleic acid to about  $5^{\circ}\text{C}$ . ( $41^{\circ}\text{F}$ .), then separating and preserving the liquid portion.

It is a yellowish, or brownish yellow, oily liquid, having a peculiar, lard-like odor and taste; becoming darker and absorbing oxygen on exposure to air. Sp. gr: about 0.900 at  $15^{\circ}\text{C}$ . Insoluble in water; soluble in alcohol, chloroform, etc. An alcoholic solution has a feebly acid reaction upon litmus paper. When cooled to  $4^{\circ}\text{C}$ . it becomes semi-solid, and, on further cooling, congeals to a whitish, solid mass. At a high temperature it is completely dissipated.

It may be obtained by adding lead oxide to almond oil, thus forming an oleate of lead, then decomposing this by means of hydrochloric acid.

#### PREPARATIONS.

Oleatum Hydrargyri, (10% Yellow Mercuric Oxide).

Oleatum Veratrinæ, (2% Veratrine).

Oleatum Zinci, (5% Zinc Oxide).

#### ACTION.

Having marked penetrating qualities, it readily passes through unbroken skin; at the same time it produces some local irritation. It forms salts with many bases, and many of these salts are soluble in an excess of oleic acid. Such oleates permeate the skin as readily as does the simple acid, and produce their several medicinal actions after absorption has taken place.

## USE.

This acid is used pharmaceutically in preparing oleates. Oleates are used after the manner of ointments, bearing in mind the fact that they are more irritating, and, at the same time, more readily absorbed than ointments. Friction is seldom required—in fact it may be quite objectionable—in applying oleates.

ACIDUM STEARICUM.  $\text{HC}_{18}\text{H}_{35}\text{O}_2$ .

## Stearic Acid.

An organic acid, in its commercial, more or less impure form, usually obtained from the more solid fats, chiefly tallow.

A hard, white, somewhat glossy solid, odorless and tasteless. Permanent in the air. Insoluble in water; soluble in about 45 parts of alcohol at  $15^{\circ}\text{C}$ .

## ACTION.

Quite similar to that of oleic acid.

## USE.

Pharmaceutically in preparing the many stearates (non-official) now in general use. The stearates make useful dusting powders in the treatment of diseased conditions of the skin, or mucous membrane.

## OTHER ACIDS.

Acidum Arsenosum . . . . .	See Arsenicum.
Acidum Benzoicum . . . . .	See Benzoinum.
Acidum Carbolicum . . . . .	See Carbon Compounds.
Acidum Chromicum . . . . .	See Chromum.
Acidum Gallicum . . . . .	See Galla.
Acidum Hydriodicum (Syrupus) . .	See Iodum.
Acidum Hydrobromicum Dilutum .	See Bromum.
Acidum Salicylicum . . . . .	See Carbon Compounds.
Acidum Sulphurosum . . . . .	See Sulphur.
Acidum Tannicum . . . . .	See Galla.

## PART III.

### THE METALS.

#### POTASSIUM. K.

This is the metallic base of the alkali *potassa*. The metal is not official.

*Sources*.—The ash left after the combustion of plants; potassium nitrate; potassium bitartrate, etc.

*General Action of the Potassium Salts*—Some of the salts have a marked caustic action through their intense affinity for water. All act as a protoplasmic poison. Small doses may increase the contractile power of muscle; large or continued doses diminish this contractile power, and finally cause paralysis. There is a paralyzing action also upon sensory and motor nerves and upon nerve centres. Blood pressure is lowered, and the pulse rate slowed.

With small, not too long continued, doses the oxygen-carrying power of the blood is increased, and this is followed by an increase in the amount of solids excreted by the kidneys, with a proportionate increase in the volume of urine. In the lithæmic the use of certain potassium salts causes a diminution in the amount of uric acid excreted, with a simultaneous increase of urea, and the appearance of calcium oxalate in the urine. This is supposed to be due to increased oxidation of uric acid, forming oxaluric acid, which product then splits up into urea and mes-oxalic acid.

Salts of high diffusion power act as diuretics, and as diaphoretics. Salts of low diffusion power used in large doses produce catharsis. Too long continued, the potassium salts interfere with nutrition, and the blood is altered in character. Poisoning is not apt to occur from the use of the non-caustic salts because elimination keeps pace with absorption.

Potassium salts have an alkalinizing action, both at the point of application and along the lines of elimination. During elimination by the kidneys the urine becomes less acid or even alkaline in reaction. Elimination through the liver causes an increased secretion of bile; the bile at the same time becoming more liquid. Elimination by the bronchial mucous membrane increases bronchial secretion; causes liquefaction of the secretion; and facilitates expectoration. Elimination through the



skin increases the alkalinity of the perspiration. Elimination through the salivary glands, diminishes or prevents acid fermentation in the mouth.

An alkaline solution coming in contact with acid-secreting glands stimulates such glands to greater activity. Thus, we may have increased desire for food, and increased gastric digestion, through stimulation of the acid-secreting glands of the stomach.

## PREPARATIONS.

Potassa . . . . .	For external use.
Potassa cum Calce. . . . .	For external use.
Liquor Potassæ . . . . .	0.30-0.95 Cc. ℥v-xv.
Potassii Carbonas . . . . .	0.30-0.95 Gm. gr. v-xv.
Potassii Bicarbonas . . . . .	0.30-1.90 Gm. gr. v-xxx.
Potassii Acetas . . . . .	0.30-1.90 Gm. gr. v-xxx.
Potassii Citras . . . . .	0.30-1.90 Gm. gr. v-xxx.
Potassii Citras Effervescens . . . . .	3.75-7.50 Gm. ʒi-ij.
Liquor Potassii Citratis . . . . .	7.50-15.00 Cc. ʒij-iv.
Potassii Bitartras . . . . .	1.90-15.00 Gm. ʒ½-iv.
Pulvis Jalapæ Compositus (see Jalapa) . . . . .	0.95-3.75 Gm. gr. xv-ʒi.
Potassii et Sodii Tartras . . . . .	3.75-15.00 Gm. ʒi-iv.
Pulvis Effervescens Compositus.	
Potassii Chloras . . . . .	0.30-0.95 Gm. gr. v-xv.
Potassii Nitras . . . . .	0.30-0.95 Gm. gr. v-xv.
Charta Potassii Nitratis.	
Argentii Nitras Dilutus . . . . .	See Argentum.
Potassii Sulphas . . . . .	3.75-15.00 Gm. ʒi-iv.
Potassii Bichromas . . . . .	See Chromum.
Potassii Bromidum . . . . .	See Bromum.
Potassii Cyanidum . . . . .	See Hydrocyanic Acid.
Potassii Ferrocyanidum . . . . .	For pharmaceutical use.
Potassii Hypophosphis . . . . .	See the Hypophosphites.
Potassii Iodidum . . . . .	See Iodum.
Potassii Nitris . . . . .	See Nitrites.
Potassii Permanganas . . . . .	See Manganum.
Potassa Sulphurata . . . . .	See Sulphur.

## POTASSA. KOH.

**Potassa.**—Caustic Potash. Potassium Hydrate. Potassium Hydroxide.

It is a white, hard, dry solid, generally in the form of pencils, odorless, or having a faint odor of lye, of a very acrid and caustic taste, and an intensely alkaline reaction. Soluble, at 15° C., in 0.5 part of water and in 2 parts of alcohol. Exposed to the air it rapidly absorbs carbon dioxide and moisture. It should be kept in well-stoppered bottles made of hard glass.

It is obtained first in an aqueous solution (see *Liquor Potassæ*). This solution, boiled down, gives a fluid of oily consistency, which, poured into paper moulds, hardens on cooling into the cylindrical sticks commonly met with.

**Potassa cum Calce.** Potassa with Lime. (*Vienna Paste.*)

It must be kept in well-stoppered bottles.

It is a grayish white powder, deliquescent, with a strongly alkaline reaction.

It is made by mixing together 50 Gm., each, of potassa and lime.

ACTION.

Potassa and Potassa cum Calce are active caustics through their intense affinity for water. The tissues to which they are applied are converted into a moist, gray slough which readily becomes septic.

USE.

Potassa (potassium hydrate) has a very limited use. As a caustic it is very painful; its action is hard to control; the slough it produces is moist and apt to become septic. The actual cautery or the surgeon's knife will generally give better results in the removal or destruction of tissue. At times it may be used in opening an abscess. For this purpose a small piece of the caustic is fastened, by means of adhesive plaster, over the the abscess wall, and an opening by no means so satisfactory as one that might have been made with a knife is secured. It may be used to cauterize the wound inflicted by a rabid animal, or a venomous reptile, but the strong acids are better for this purpose because their action is more easily controlled. It cannot be safely used upon mucous membranes because of the rapidity with which it spreads over moist surfaces.

Potassa cum Calce is used for much the same purpose as potassa with this advantage; its action is more easily controlled because the lime by its hydration forms an insoluble substance (slaked lime).

TOXICOLOGY.

Potassa and Potassa cum Calce are even more active irritant poisons than are the strong acids. There is a disagreeable taste which is quickly followed by a burning pain in the mouth, extending to the stomach; vomiting, diarrhoea, and symptoms of depression will also be present. The eschar formed along the line of contact with the skin or mucous membrane will be moist and grayish.

*Treatment.*—Give acid drinks, diluted vinegar, diluted mineral acids, lemonade, etc. Give plenty of water. Later use demulcents, such as egg albumin, milk, oil, etc.

**LIQUOR POTASSÆ.**

**Solution of Potassa.** Solution of Potassium Hydrate.

This is a 5 per cent. aqueous solution of potassa. A clear, colorless liquid, odorless, having a very acrid and caustic taste, and a strongly alkaline reaction. Sp. gr.: about 1.036 at 15° C.

Prepared from Potassium carbonate and lime.

**ACTION.**

Locally it combines with fatty matter, forming soap. It softens epidermic scales and horny growths. Undiluted, it is slightly caustic or irritant. Well diluted, it may have a sedative action.

Internally, its alkalinizing action is apparent in the stomach and along the lines of elimination. Given after meals, it neutralizes the gastric acidity, and impairs or improves digestion according to circumstances. A small dose given before meals will increase the action of the acid-secreting glands of the stomach. Given between meals, properly diluted, it is absorbed and then has the general action of potassium carbonate, as an alkalinizer. If the internal use is continued for some time symptoms resembling those of scurvy may appear, such as passive hemorrhages, puffiness of the skin, general emaciation, etc.

**USE.**

A 20 per cent. aqueous solution may be used locally to soften horny epithelium—an ingrowing toe nail, corns, the scales of a chronic eczema, etc.

Internally, it may be used as a general alkalinizer, but it is not well borne by the stomach and is inferior to the potassium bicarbonate, acetate or citrate for internal administration.

**POTASSII CARBONAS.  $K_2CO_3$ .**

**Potassium Carbonate.** Salt of Tartar.

It should be kept in well-stoppered bottles.

A white crystalline, or granular, powder, very deliquescent; odorless, having a strongly alkaline taste, and an alkaline reaction. Soluble in 1.1 parts of water at 15° C.; insoluble in alcohol.

The impure carbonate (pearlash) is the product of lixiviation of wood ashes, and the pure carbonate is prepared from this.

**ACTION.**

Potassium carbonate is less irritating than potassa, but more irritating than the bicarbonate. Locally, it acts as a mild irritating alkalinizer; well diluted, it may have a local sedative action. Absorbed, it acts as a general alkalinizer throughout the system and along the lines of elimination.

## USE.

Locally as a lotion (10 per cent.), or as an ointment (2 to 10 per cent), for its alkalinizing properties, and also for its sedative properties, to relieve the severe pruritus which accompanies certain skin diseases.

Internally it is seldom used, because, with its disagreeable flavor and its irritant action, it is inferior as an alkalinizer to certain other potassium and sodium salts.

**POTASSII BICARBONAS.  $\text{KHCO}_3$ .****Potassium Bicarbonate. Saleratus.**

It should be kept in well-stoppered bottles.

It occurs in colorless, transparent prisms, permanent in dry air ; odorless, having a saline and slightly alkaline taste, and an alkaline reaction. Soluble in 3.2 parts of water at  $15^\circ \text{C}$ .; almost insoluble in alcohol.

It is prepared by passing carbon dioxide into a strong solution of potassium carbonate.

## ACTION.

Locally it has not the alkalinizing action of the potassium preparations already considered. After absorption it has the action of a general alkalinizer like the carbonate.

## USE.

It may be used in dyspepsia accompanied by excessive gastric acidity, but the sodium bicarbonate is generally preferred. In diarrhoea, with acid stools, it is preferred by some prescribers to the sodium bicarbonate, because, with its greater solubility, a larger quantity may be given without increasing the bulkiness of the dose : thus, *potassii bicarbonatis*, 15.00 Gm.; *syrupus rhei aromaticus*, 15.00 Cc.; *syrupus rhei dulcis ad*, 90.00 Cc. M. sig. One-half teaspoonful for a child four or five years of age, twice or thrice daily. In the alkaline treatment of rheumatism thirty-grain doses may be given every three or four hours until the urine becomes alkaline. After this result is secured a sufficient quantity of the drug is continued to keep the urine neutral or alkaline.

**POTASSII ACETAS.  $\text{KC}_2\text{H}_3\text{O}_2$ .****Potassium Acetate.**

It should be kept in well-stoppered bottles.

It occurs in white, satiny, crystalline masses, or as a white granular powder, very deliquescent, odorless, having a mild, saline taste, and a neutral or faintly alkaline reaction. Soluble, at  $15^\circ \text{C}$ ., in 0.36 part of water, and in 1.9 parts of alcohol.

Prepared by dissolving potassium carbonate in acetic acid.

## ACTION

Potassium acetate has no direct alkalinizing properties. After absorption it is quickly converted into the carbonate, and then has the general alkalinizing action of this salt. It is less irritating than the carbonate. As one of the potassium salts, with high diffusive power, it is an active diuretic and a mild diaphoretic.

## USE.

It may be used as a diuretic in dropsical affections; also when the secretion of urine is diminished. It may be used for its general alkalinizing properties in the treatment of rheumatism.

**Potassium Citrate.**

It should be kept in well-stoppered bottles.

It is a white granular powder, deliquescent; odorless, having a faintly alkaline taste, and a neutral or faintly alkaline reaction. Soluble in 0.6 part of water at 15° C. Slightly soluble in alcohol.

Prepared from potassium carbonate by neutralizing with citric acid.

**Liquor Potassii Citratis.** Solution of Potassium Citrate.

This contains about 9 per cent. of anhydrous potassium citrate, with some free citric and carbonic acids.

**Potassii Citras Effervescens.** Effervescent Potassium Citrate.

This is made from citric acid, 63 Gm.; potassium bicarbonate, 90 Gm.; sugar, 47 Gm.; and is reduced to the form of powder. It must be kept in well-stoppered bottles.

## ACTION.

Potassium citrate, like the acetate, has no direct alkalinizing properties. It, too, is converted into the carbonate after absorption. Like the acetate it is an active diuretic and a mild diaphoretic.

## USE.

The same as that of the acetate. It is the more agreeable salt of the two in every way.

**Potassium Bitartrate.** Cream of Tartar.

It occurs as colorless, or slightly opaque, crystals; or as a white, somewhat gritty, powder, permanent in the air, odorless, having a pleasant, acidulous taste, and an acid reaction. Soluble in 201 parts of water at 15° C. Sparingly soluble in alcohol.



Prepared from argol, deposited in casks during the fermentation of grape juice, by purification and evaporation.

#### ACTION.

The bitartrate does not appear to be converted into the carbonate after absorption, and has no alkalinizing action. Small doses have a diuretic action. Large doses act as a saline purgative, increasing intestinal secretion to such a degree as to cause distension of the bowel, and this distension causes increased peristalsis and griping. It makes a pleasant, cooling, saline drink in the form of the so-called *potus imperialis* (1 per cent. each of cream of tartar and lemon juice, with 8 per cent. white sugar in boiling water).

#### USE.

It may be used as a diuretic (1.90–3.75 Gm.), well diluted in dropsical conditions due to hepatic or renal diseases. Also when there is scanty secretion of urine. As a laxative it is used in dropsical conditions, generally in combination with other laxatives: sulphur, magnesia, or jalap, the last in the official **pulvis jalapæ compositus**.

The **potus imperialis** may be used as a cooling, pleasant drink in febrile conditions.

#### POTASSII ET SODII TARTRAS. $\text{KNaC}_4\text{H}_4\text{O}_6 + 4\text{H}_2\text{O}$ .

**Potassium and Sodium Tartrate.** Rochelle Salt.

It occurs in colorless, transparent crystals, slightly efflorescent in dry air; or as a white powder; odorless, having a cooling, mildly saline, and bitter taste, and a neutral reaction. Soluble in 1.4 parts of water at 15° C.; almost insoluble in alcohol.

Prepared by boiling potassium tartrate in a solution of sodium carbonate.

**Pulvis Effervescens Compositus.** Seidlitz Powder.

This is put up in two papers; (1) contains 35 grains of tartaric acid; (2) contains sodium bicarbonate, 40 grains, potassium and sodium tartrate, 120 grains.

#### ACTION.

This salt, like the bitartrate, acts chiefly as a saline hydragogue cathartic.

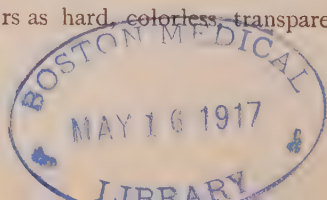
#### USE.

When cathartics of this class are required this salt is one of the most agreeable, either in its own form or as seidlitz powder.

#### POTASSII SULPHAS. $\text{K}_2\text{SO}_4$ .

**Potassium Sulphate.**

It occurs as hard, colorless, transparent prisms or as a white powder,



permanent in the air ; odorless, having a sharp, saline, slightly bitter taste, and a neutral reaction. Soluble in 9.5 parts of water at  $15^{\circ}$  C. ; insoluble in alcohol.

It is obtained as a by-product in the preparation of nitric acid from potassium nitrate. It is also found native in the Vesuvian lavas.

#### ACTION.

This is another potassium salt of low diffusion power, hence a saline purgative. It is harsh and disagreeable in action.

#### USE.

It is seldom used alone, but is in extensive use as one of the constituents of many of the laxative natural mineral waters.

### POTASSII CHLORAS. $KClO_3$ .

#### Potassium Chlorate.

It occurs in colorless prisms or plates, or as a white powder permanent in the air ; odorless, having a cooling, saline taste, and a neutral reaction. Soluble in 16.7 parts of water at  $15^{\circ}$  C., in 1.7 parts of boiling water ; sparingly soluble in alcohol.

Prepared from potassium carbonate by treating it with lime and chlorine.

It should be kept in glass-stoppered bottles, and should not be triturated with readily oxidizable or combustible substances.

#### ACTION.

Potassium chlorate has a specific action of its own, as a refrigerant, diuretic and antiseptic. The manner of its action is not well understood. It undergoes but slight chemical change in passing through the system, and is eliminated in its own form by all of the secretions. It exercises a stimulating or irritant action along the lines of elimination.

#### USE.

It is used in various inflammations of the mouth as a gargle or wash, or by internal administration. Its internal use secures a constant local action of the drug during its elimination by the salivary glands.

#### TOXICOLOGY.

With the exception of the potassium cyanide this is the most poisonous of the potassium salts. Large repeated doses may cause acute nephritis, and also marked changes in the character of the blood. The blood corpuscles are disorganized and lose their oxygen carrying power ; the hæmoglobin is converted into met hæmoglobin and as a consequence the blood assumes a chocolate color. There is also discolorization of the skin ; enlargement of the liver and spleen ; sometimes jaundice ; diminished

quantity, or even suppression of urine with its color changed to a dark reddish-brown or black. Albumin may be present in the urine, the result of the acute nephritis set up.

There may be marked tenderness throughout the body; cramps, headache, delirium, coma, death. Very large single doses may cause death speedily with symptoms of irritation throughout the alimentary canal, together with cardiac failure.

*Treatment.*—When dangerous symptoms appear from slow poisoning, discontinue the drug and hasten its elimination by the drinking freely of water. Demulcents may also be used. Other treatment should be conducted on general principles.

#### POTASSII NITRAS. $\text{KNO}_3$ .

**Potassium Nitrate.** Nitre. Saltpetre. Sal Prunelle.

It occurs as colorless, transparent prisms, or as a crystalline powder, permanent in the air; odorless, having a cooling, saline, and pungent taste, and a neutral reaction. Soluble in 3.8 parts of water at  $15^\circ \text{C}$ .; almost insoluble in alcohol.

It is found native.

**Charta Potassii Nitratis.** Asthma paper.

This is unsized paper which has been dipped in a 20 per cent. solution of potassium nitrate, and then dried.

#### ACTION.

The nitrate resembles the chlorate somewhat in action. Small doses well diluted act as a stimulating diuretic. Large doses may cause irritation of the kidneys attended by albuminuria, hæmaturia, etc. There is a marked depressant action upon the heart from the continued use of the drug. Nausea, vomiting and diarrhoea may be present as the result of irritation throughout the alimentary canal.

#### USE.

This is quite limited now, the potassium acetate and potassium citrate being safer as diuretics. The fumes from the burning **charta potassii nitratis** are inhaled to relieve asthma.

#### TOXICOLOGY.

The symptoms produced are those of an irritant poison, together with the effects of the potassium compounds generally. Next to potassium chlorate it is the most poisonous of the potassium salts. It is more irritant than the chlorate, but it does not produce similar changes in the blood.

*Treatment.*—There is no chemical antidote. Treatment must be conducted on general principles.

## SODIUM. Na.

This is the metallic base of the alkali *soda*. The metal is not official.

*Sources*.—Sodium chloride (common salt) from sea water or from salt mines; sodium nitrate (Chili saltpetre) and sodium borate (borax).

*General Action of the Sodium Salts*.—Sodium salts are both absorbed and eliminated more slowly than the potassium salts. As a consequence the caustic preparations do not burn so deeply, and the poisonous properties are less pronounced. In other respects there is a close relation between the potassium and sodium salts. As alkalizers for internal use, the sodium salts are generally preferred because of their more prompt action, due to slower elimination, and because they are less offensive to the taste and less irritating in the stomach.

## PREPARATIONS.

Soda . . . . .	For external use.
Liquor Sodæ . . . . .	0.30–0.95 Cc. m. v–15.
Sodii Chloridum . . . . .	1.90–3.75 Gm. $3\frac{1}{2}$ –j.
Sodii Carbonas . . . . .	0.30–0.95 Gm. gr. v–xv.
Sodii Carbonas Exsiccatus . . . . .	0.30–0.95 Gm. gr. v–xv.
Sodii Bicarbonas . . . . .	0.30–1.90 Gm. gr. v–xxx.
Trochisci Sodii Bicarbonatis . . . . .	1=0.18 Gm. or gr. iij.
Mistura Rhei et Sodæ . . . . .	See Rheum.
Sodii Acetas . . . . .	0.30–1.90 Gm. gr. v–xxx.
Sodii Boras . . . . .	0.30–0.95 Gm. gr. v–xv.
Sodii Phosphas . . . . .	1.90–7.50 Gm. $3\frac{1}{2}$ –ij.
Sodii Pyrophosphas . . . . .	Pharmaceutical use.
Sodii Sulphas . . . . .	3.75–15.00 Gm. $\mathfrak{z}$ j–iv.
Sodii Chloras . . . . .	0.30–0.95 Gm. gr. v–xv.
Sodii Nitras . . . . .	0.30–0.95 Gm. gr. v–xv.
Sodii Ethylatis, Liquor. . . . .	For external use.
Sodii Silicatis, Liquor . . . . .	For making splints.
Sodæ Chloratæ, Liquor . . . . .	See Chlorum.
Sodii Arsenas. . . . .	See Arsenum.
Sodii Benzoas . . . . .	See Benzoinum.
Sodii Bromidum . . . . .	See Bromum.
Sodii Hypophosphis . . . . .	See Phosphorus.
Sodii Iodidum . . . . .	See Iodum.
Sodii Nitris . . . . .	See Nitrites.
Sodii Salicylas . . . . .	See Salicylic Acid.
Sodii Sulphocarbolas . . . . .	See Carbolic Acid.
Sodii Sulphis. . . . .	See Sulphur.
Sodii Bisulphis . . . . .	See Sulphur.
Sodii Hyposulphis . . . . .	See Sulphur.

**SODA.** NaOH.

**Soda.** Sodium Hydrate. Sodium Hydroxide. Caustic Soda.

Soda should be kept in well-stoppered bottles made of hard glass.

It occurs in dry, white, translucent pencils, or fused masses; odorless, and having an acrid and caustic taste. Exposed to the air, it rapidly deliquesces, absorbs carbon dioxide, and becomes covered with a dry coating of carbonate. Soluble in 1.7 parts of water at 15° C.; very soluble in alcohol.

It is obtained first in an aqueous solution from sodium carbonate by treating it with lime. This is reduced by evaporation until the water is driven off and the soda remains in a fluid state of oily consistency. It is then poured into cylindrical moulds and allowed to cool; or it may be allowed to harden *en masse*.

**ACTION.**

While soda, like potassa, is an active caustic it is less soluble and therefore more manageable.

**USE.**

It may be used as a caustic in the same class of cases as those referred to under potassa.

**TOXICOLOGY.**

The toxicology is practically the same as that of potassa.

**LIQUOR SODÆ.**

**Solution of Soda.** Solution of Sodium Hydrate.

An aqueous solution containing about 5 per cent. of the sodium hydrate (NaOH). It is a clear, colorless liquid, having an acrid and caustic taste, and a strongly alkaline reaction. Sp. gr.: about 1.059 at 15° C.

It should be kept in bottles made of green glass, and provided with glass stoppers coated with paraffin or petrolatum.

It is obtained by the action of lime on sodium carbonate in solution; or by dissolving soda.

**ACTION.**

That of an alkalinizer.

**USE.**

After the manner of liquor potassa when used at all.

**SODII CHLORIDUM.** NaCl.

**Sodium Chloride.** Common Salt.

It occurs in small, white crystals, or as a white crystalline powder, odorless, having a purely saline taste and a neutral reaction; permanent in dry air. Soluble in 2.8 parts of water at 15° C.; almost insoluble in alcohol.

It is found native. Also prepared from sea-water by evaporation.



## ACTION.

Sodium chloride is a normal constituent of the body and is taken into the system rather as a food than as a therapeutic agent. It plays an important part in increasing tissue change.

Externally it has a local cleansing, stimulating or irritant action, according to the strength of the solution.

Internally a large dose (3.75 Gm.) acts as an irritant emetic. Small doses aid digestion, and also tend to dislodge tenacious mucous secretions throughout the alimentary canal.

## USE.

As a local stimulant in the form of baths at the seashore. A salt-water bath (1 pound of salt to 4 gallons of water) may in part take the place of sea-water bathing. A  $\frac{1}{2}$  to 1 per cent. solution may be used to remove tenacious mucous or dried secretions from mucous surfaces. A 3 to 5 per cent. solution may be used as an enema to destroy pin worms. An emetic dose may be used where prompt emesis is wanted as in some cases of poisoning. A  $\frac{1}{10}$  per cent. sterilized solution (2 teaspoonfuls to the quart of water) may be used by hypodermoclysis to counteract the loss of fluid from the circulation in the treatment of cholera, severe hemorrhages, etc.

**SODII CARBONAS.**  $\text{Na}_2\text{CO}_3 + 10\text{H}_2\text{O}$ .

**Sodium Carbonate.** Washing Soda.

It should be kept in well-closed vessels.

It occurs in large, colorless crystals, efflorescing in dry air; odorless, with a sharp alkaline taste and an alkaline reaction. Soluble in 1.6 parts of water at 15° C.; insoluble in alcohol.

Prepared from sodium sulphate by roasting it with calcium carbonate and coal.

**Sodii Carbonas Exsiccatus.** Dried Sodium Carbonate.

It is obtained from sodium carbonate by exposure to a temperature of 45° C. (113° F) until it has lost one-half of its weight by driving off a part of its water of crystallization. It is a white, very hygroscopic powder, and should be kept in well-stoppered bottles.

## ACTION.

That of a local and general alkalinizer.

## USE.

Locally a 1 to 5 per cent. solution in the form of a lotion or bath, or a 5 to 10 per cent. ointment, may be used in various skin diseases when pruritus is a prominent symptom.

Internally it is seldom used because of its irritating qualities. At the same time other alkalinizers are quite as efficient therapeutically.

### **SODII BICARBONAS.** $\text{NaHCO}_3$ .

**Sodium Bicarbonate.** Baking Soda. Saleratus.

It should be kept in well-stoppered bottles, in a cool place.

It occurs as a white, opaque powder, permanent in the air, odorless, having a cooling, mildly saline taste, and a slightly alkaline reaction. Soluble in 11.3 parts of water at  $15^\circ \text{C}$ .; insoluble in alcohol. Decomposed by hot water, losing its carbon dioxide.

It is prepared by saturating the dry sodium carbonate with carbon dioxide. It contains at least 98.6 per cent. of the pure salt.

**Trochisci Sodii Bicarbonatis.** Each troche contains 0.18 Gm. (3 grains) of the salt.

#### **ACTION.**

That of a local and general alkalinizer like the carbonate. It is less irritating than the carbonate. It has also a less disagreeable taste.

#### **USE.**

Locally it may be used, as a 1 to 5 per cent. solution, to allay the itching of various skin diseases. It is also used in various preparations, such as "Dobell's Solution," "Seiler's Lotion," etc., to dissolve tenacious catarrhal secretions.

Internally it is the favorite alkalinizer in acid dyspepsia; in the uric acid diathesis; in chronic cystitis; in chronic bronchitis.

Several of the alkaline mineral waters owe their action, in part, to this salt.

### **SODII BORAS.** $\text{Na}_2\text{B}_4\text{O}_7 + 10\text{H}_2\text{O}$ .

**Sodium Borate.** Borax.

It occurs as colorless, transparent prisms, or as a white powder, slightly efflorescent in warm, dry air; odorless, having a mild, cooling, sweetish, afterward somewhat alkaline taste, and an alkaline reaction. Soluble in 16 parts of water at  $15^\circ \text{C}$ .; insoluble in alcohol; soluble in 1 part of glycerin.

Borax is found native. It may also be prepared artificially by boiling together boric acid and sodium in proper proportions.

#### **ACTION.**

This salt has a weak alkalinizing and a mild antiseptic action. It is also mildly absorbent, protectant and sedative.

#### **USE.**

Sodium borate is used locally as a 5 per cent. solution in the treatment of freckles; as a saturated solution to relieve severe itching. In combi-

nation with other alkalis it is used for its stimulating, antiseptic and cleansing properties in catarrhal conditions of mucous membranes. It is second only to potassium chlorate in the treatment of stomatitis, thrush, etc., when used as a non-saccharine, non-mucilaginous solution. In the treatment of sub-acute pharyngitis, aphonia, hoarseness, etc., a small piece of borax may be allowed to slowly dissolve in the mouth, thus securing a prolonged local action. Internally it may be used in the treatment of epilepsy, but it is by no means an important drug in this disease.

**SODII ACETAS.**  $\text{NaC}_2\text{H}_3\text{O}_2 + 3\text{H}_2\text{O}$ .

**Sodium Acetate.**

It should be kept in well-stoppered bottles.

It occurs as large, colorless, transparent prisms, or as a granular, crystalline powder, efflorescent in warm dry air; odorless, having a cooling, saline, bitter taste, and a neutral or faintly alkaline reaction. Soluble, at  $15^\circ \text{C}$ ., in 1.4 parts of water, and in 30 parts of alcohol.

Prepared from sodium carbonate by neutralizing it with acetic acid.

**ACTION.**

Sodium acetate resembles potassium acetate in its action as a diuretic, diaphoretic and remote alkalizer.

**USE.**

The same as that of the potassium acetate. As a matter of fact it is seldom used, the potassium acetate being generally preferred.

**SODII PHOSPHAS.**  $\text{Na}_2\text{HPO}_4 + 12\text{H}_2\text{O}$ .

**Sodium Phosphate.** Sodium Orthophosphate. Tasteless purging salt.

It should be kept in well-stoppered bottles, in a cool place.

It occurs in large, colorless, transparent prisms, quickly efflorescing and becoming opaque on exposure to air; odorless, having a cooling, saline and feebly alkaline taste, and a slightly alkaline reaction. Soluble in 5.8 parts of water at  $15^\circ \text{C}$ .; insoluble in alcohol.

It may be obtained by decomposing bone-ash with sulphuric acid and saturating the acid calcium phosphate thus obtained with sodium carbonate.

**ACTION.**

Sodium phosphate is a mild laxative, an hepatic stimulant and a feeble alkalizer.

**USE.**

It may be used as a mild laxative, especially for children. It may be used in non-purgative doses to correct bowel derangements due to diminished secretion of bile; in obstructive jaundice; in the diarrhœas attended by acid stools. It is also used in rickets in non-purgative doses.

**SODII PYROPHOSPHAS.**  $\text{Na}_4\text{P}_2\text{O}_7 + 10\text{H}_2\text{O}$ .**Sodium Pyrophosphate.**

It occurs as colorless, transparent prisms, or as a crystalline powder ; odorless, having a cooling, saline and feebly alkaline taste, and a feebly alkaline reaction. Permanent in cool air, slightly efflorescent in warm air. Soluble in 12 parts of water at  $15^\circ \text{C}$ . ; insoluble in alcohol.

Prepared by heating sodium phosphate in a suitable vessel to redness.

**ACTION.**

That of the sodium phosphate.

**USE.**

Pharmaceutically in preparing the soluble ferric pyrophosphate.

**SODII SULPHAS.**  $\text{Na}_2\text{SO}_4 + 10\text{H}_2\text{O}$ .**Sodium Sulphate.** Glauber's salt.

It should be kept in well-closed vessels.

It occurs in large, colorless, transparent prisms, or granular crystals, rapidly efflorescing on exposure to dry air, and finally losing all its water of crystallization ; odorless, having a peculiar saline and somewhat bitter taste, and an alkaline reaction. Soluble in 2.8 parts of water at  $15^\circ \text{C}$ . ; insoluble in alcohol.

Found native. It may also be obtained from the acid residue left in the manufacture of hydrochloric acid, by neutralizing it with sodium carbonate and crystallizing.

**ACTION.**

Sodium Sulphate is an active saline purgative, producing much discomfort due to nausea and griping.

**USE.**

It is but little used alone because of its disagreeable taste and unpleasant action. In many of the laxative natural mineral waters (Carlsbad, Friedrichshall, Hunyadi-janos, etc.), this salt is one of the active ingredients, and in such combination it is used in chronic diarrhoea due to intestinal catarrh ; in obstructive jaundice ; in chronic constipation, etc.

**SODII CHLORAS.**  $\text{NaClO}_3$ .**Sodium Chlorate.**

It should be kept in glass-stoppered bottles. It is easily oxidizable and great care should be observed in handling the salt, as dangerous explosions are liable to occur when it is mixed with organic substances.

It occurs in colorless, transparent crystals, or as a crystalline powder ; odorless, having a cooling, saline taste, and a neutral reaction. Permanent

in dry air. Soluble, at  $15^{\circ}\text{C.}$ , in 1.1 parts of water and in about 100 parts of alcohol.

Prepared from sodium carbonate by treating it with lime and chlorine, or by mixing a solution of potassium chlorate with a hot solution of sodium bitartrate.

#### ACTION.

Sodium chlorate has the general action of potassium chlorate without any therapeutic advantages.

#### USE.

It is seldom used, but may be prescribed after the manner of potassium chlorate.

### SODII NITRAS. $\text{NaNO}_3$

**Sodium Nitrate.** Chili saltpetre.

It should be kept in well-stoppered bottles.

It occurs as colorless, transparent crystals; odorless, having a cooling, saline, and slightly bitter taste, and a neutral reaction. Deliquescent in moist air. Soluble in, at  $15^{\circ}\text{C.}$ , 1.3 parts of water, and in about 100 parts of alcohol.

It is found native, and purified by crystallization from water.

#### ACTION.

Sodium nitrate closely resembles the potassium nitrate in action, except that it is far less toxic.

#### USE.

It is but little used.

### Φ SODII ETHYLAS. $\text{Na}_2\text{CH}_3\text{O}$ .

**Sodium Ethylate.** Caustic alcohol.

It is a brownish or whitish powder, readily oxidizable. It must be kept in a cool place in well-stoppered bottles. Upon contact with the smallest quantity of water, or living tissue, it splits up into alcohol and caustic soda. A solution is official in the B. P. made by dissolving 1 part of metallic sodium in 20 parts of ethylic alcohol in a flask kept cool in a stream of cold water. This solution should be freshly made. It is a colorless liquid, of syrupy consistence, becoming brown on keeping.

Prepared by dropping small pieces of metallic sodium into absolute alcohol kept at a temperature of  $10^{\circ}\text{C.}$  ( $50^{\circ}\text{F.}$ ) until reaction ceases. The temperature is then raised to  $38^{\circ}\text{C.}$  ( $100^{\circ}\text{F.}$ ), and the addition of sodium continued until hydrogen ceases to be given off. The product is then dissolved in half a fluid ounce of absolute alcohol. On cooling, the sodium ethylate crystallizes out in large laminæ.



## ACTION.

In the presence of moisture, sodium ethylate has a caustic action. It is decomposed into sodium hydrate and ethylic alcohol, and as this decomposition takes place there is a gradual destruction of tissue. The pain produced during the caustic action is said to be less than that caused by many of the active caustics. This pain can be easily controlled by the use of local anæsthetics. The eschar formed is dry, thus differing from that formed by potassa or soda. The scar left is less pronounced than that produced by other caustics.

## USE.

It may be used to destroy hairy growths, nævi, etc. Application is made by means of a glass rod.

## LIQUOR SODII SILICATIS.

## Solution of Sodium Silicate.

It should be kept in well-stoppered bottles.

A semi-transparent, almost colorless, or yellowish, or pale greenish-yellow, viscid liquid; odorless, having a sharp, saline, and alkaline taste, and an alkaline reaction. Sp. gr. : 1.300 to 1.400 at 15° C.

It contains about 20 per cent. silica and 10 per cent. soda.

## USE.

It is used in applying permanent splints. It makes a lighter splint than Plaster-of-Paris, and a stronger splint than starch.

## LITHIUM. Li.

A metal having a silver-white lustre, quickly tarnishing in the air. The metal is not official.

*Sources.*—Native silicates and phosphates of lithium and other metals.

*General Action of the Lithium Salts.*—The lithium salts have much the same action on muscle, nerve and nerve centres, as have the potassium salts. As protoplasmic poisons they are even more active. They are practically *useless* in the treatment of the uric acid diathesis.

## PREPARATIONS.

Lithii Carbonas . . . . .	0.30–0.95 Gm.	gr. v–xv.
Lithii Citras . . . . .	0.30–0.95 Gm.	gr. v–xv.
Lithii Citras Effervescens . . . . .	3.75–7.50 Gm.	ʒi–ii.
Lithii Benzoas . . . . .	See Benzoinum.	
Lithii Bromidum . . . . .	See Bromum.	
Lithii Salicylas . . . . .	See Salicylic Acid.	

**LITHII CARBONAS.**  $\text{Li}_2\text{CO}_3$ .**Lithium Carbonate.**

It is a light white powder, permanent in the air ; odorless, having an alkaline taste and reaction. Soluble in 30 parts of water at  $15^\circ\text{C}$ . Soluble in acids with copious effervescence ; insoluble in alcohol.

Prepared from the lithium chloride by precipitating it with the ammonium carbonate.

**ACTION.**

Lithium carbonate is not so soluble as the potassium carbonate, hence it is not so irritating to the stomach. It has a more marked action in alkalinizing the urine than have the potassium or sodium salts. It has been supposed to enter into combination with uric acid, forming urates that are more soluble than those formed with potassium or sodium. This is a therapeutic error of old standing. The tendency is towards the formation of the more *insoluble*, not of the more soluble compounds. For lithium to be of any service in preventing the deposit of urates in the joints, all bases which form compounds with uric acid of *less* solubility than lithic urate (potassium, sodium, ammonium) must be absent, and this never occurs.

**USE.**

Since the chemical fallacy which has been the theoretical basis for the use of lithium salts in gout and rheumatoid arthritis has been pointed out, such use is referred to here only to be condemned. The lithium carbonate may be used where it is desirable to render the urine alkaline.

**LITHII CITRAS.**  $\text{Li}_3\text{C}_6\text{H}_5\text{O}_7$ .**Lithium Citrate.**

It should be kept in well-stoppered bottles.

It is a white powder, deliquescent on exposure to air ; odorless, having a cooling, slightly alkaline taste, and a neutral reaction. Soluble in 2 parts of water at  $15^\circ\text{C}$ . ; sparingly soluble in alcohol.

Prepared from the lithium carbonate by dissolving it in citric acid.

**Lithii Citras Effervescens.** Effervescent Lithium Citrate.

It must be kept in well-stoppered bottles.

A white, dry powder, with the general features of lithium citrate.

Prepared from lithium carbonate, 70 Gm. ; sodium bicarbonate, 280 Gm. ; citric acid, 370 Gm. ; sugar to 1000 Gm.

**ACTION.**

The citrate, like other citrates, becomes changed into a carbonate after entering the circulation, and its action then becomes that of the carbonate. It is not alkaline under its own form, and therefore has no

local alkalinizing properties. It is pleasanter to the taste and more grateful to the stomach than is the carbonate.

#### USE.

To alkalinize the urine.

#### AMMONIUM. $\text{NH}_4$ .

A name given to the hypothetical base, ammonia, analogous to a metal.

#### AMMONIA. $\text{NH}_3$ .

Formed by the union of nitrogen and hydrogen during the process of decomposition of animal or vegetable tissues.

*Sources.*—The principal commercial source of ammonia is the ammoniacal liquor from gas works, although some is obtained during the dry distillation of bones in making animal charcoal.

Ammonia is a gas, colorless, very soluble in water, having a pungent and suffocative odor, and a transient alkaline reaction. It can be liquefied by pressure. Its density is about half that of atmospheric air. It is not official.

*General Action of Ammonia.*—Applied locally ammonia acts as a rubefacient. If evaporation be prevented it then acts as a powerful and painful irritant, destroying the parts and forming a slough.

Inhaled it acts as an irritant. Moderate irritation may cause bronchitis, or pulmonary oedema. Severe irritation may result in sudden death through spasm, or oedema of the glottis.

Its alkalinizing properties are limited to its local action on the skin or mucous surface to which it is applied. After absorption it is oxidized and probably eliminated as nitric acid, although some claim that it is almost entirely converted into urea and eliminated as such.

Ammonia increases the acidity of the urine—the reverse of sodium, potassium, and lithium. It increases the formation of glycogen in the liver. It increases the secretion of the mucous glands of the bronchi, and of the intestines. It also increases the action of the sweat glands and of the kidneys.

Its chief action is that of a cardiac and respiratory stimulant. This action may be produced quickly by inhaling the vapor, thus stimulating the nasal branch of the fifth nerve and reflexly exciting the vaso-motor center, the respiratory center and the accelerator nerve center of the heart. The same effect on respiration and circulation may be secured by internal or hypodermatic administration of the drug, but more time is then required.

Moderate doses act as a spinal stimulant, increasing reflex action. Large doses may cause tetanic convulsions followed by paralysis.

## PREPARATIONS.

Aqua Ammonia Fortior . . . . .	For external use.
Aqua Ammonia . . . . .	0.30-0.95 Cc. m. v-xv.
Spiritus Ammonia . . . . .	0.30-0.95 Cc. m. v-xv.
Spiritus Ammonia Aromaticus . . . . .	0.30-0.95 Cc. m. v-xv.
Linimentum Ammonia . . . . .	For external use.
Liquor Ammonii Acetatis . . . . .	3.75-15.00 Cc. zi-iv.
Ammonii Carbonas . . . . .	0.30-0.60 Gm. gr. v-x.
Ammonii Chloridum . . . . .	0.30-0.60 Gm. gr. v-x.
Ammonii Nitras . . . . .	Pharmaceutical use.
Ammonii Benzoas . . . . .	See Benzoinum.
Ammonii Bromidum . . . . .	See Bromum.
Ammonii Iodidum . . . . .	See Iodum.
Ammonii Valerianas . . . . .	See Valeriana.

## AQUA AMMONIAE FORTIOR.

**Stronger Ammonia Water.**

An aqueous solution of ammonia ( $\text{NH}_3$ ) containing 28 per cent., by weight, of the gas. It should be kept in strong, well-stoppered bottles, not completely filled, in a cool place.

A colorless, transparent liquid, having an excessively pungent odor, a very acrid and alkaline taste, and a strongly alkaline reaction. Sp. gr.: 0.901 at  $15^\circ \text{C}$ .

Prepared from the ammonium chloride, or sulphate, by heating with lime and saturating a quantity of water with the gaseous ammonia ( $\text{NH}_3$ ) given off.

## AQUA AMMONIAE.

**Ammonia Water.**

An aqueous solution of ammonia ( $\text{NH}_3$ ) containing 10 per cent., by weight, of the gas. It should be kept in glass-stoppered bottles, in a cool place.

A colorless, transparent liquid, having a very pungent odor, an acrid, alkaline taste, and a strongly alkaline reaction. Sp. gr.: 0.960 at  $15^\circ \text{C}$ .

Prepared by diluting the stronger ammonia water to the proper percentage of gas.

## ACTION.

Either of the official waters, if inhaled incautiously, will cause severe irritation, and even inflammation of the respiratory organs. If applied to the skin undiluted, and evaporation prevented, they will cause pain, redness, and blistering; or freely diluted, they will act as local alkalinizers.

Internally, properly diluted, they act as local alkalinizers; they

also tend to allay nausea and expel flatus. When absorbed they quickly produce stimulation of the heart and respiration.

#### USE.

Locally as an alkalinizer over an insect bite or sting the **aqua** may be used. By inhalation it may be used as a cardiac stimulant in syncope, chloroform narcosis, alcoholic coma, etc. Great care must be used when administering this vapor by inhalation to an unconscious patient, otherwise dangerous or even fatal inflammation of the air passages may result. Hypodermatically 0.60–0.95 Cc. (10 to 15 minims) of the **aqua** may be given every few minutes, as required, when quick cardiac or respiratory stimulation is wanted, as in cases already referred to under its administration by inhalation.

Internally it may be used for its antacid and antispasmodic action; also for its stimulating action on secretion, but this last effect is better secured by the ammonium carbonate, *q. v.* In the treatment of drunkenness it acts not only as a stimulant diminishing the alcoholic craving, but also through its alkalinizing properties tends to restore a normal gastric secretion.

#### TOXICOLOGY.

Ammonia acts chiefly as an irritant poison.

*Treatment.*—Give vinegar, lemon juice, or diluted mineral acids to neutralize the alkali. Oils, mucilaginous drinks, and other demulcents are then given to protect and soothe the irritated mucous membrane. Further than this the treatment is symptomatic.

#### LINIMENTUM AMMONIÆ.

**Ammonia Liniment.** Volatile Liniment.

Prepared from ammonia water, 350; alcohol, 50; and cotton-seed oil, 600 Cc.

#### ACTION.

The local stimulating and irritant action of ammonia water.

#### USE.

It may be used where local stimulation and rubefaction are wanted.

#### SPIRITUS AMMONIÆ.

**Spirit of Ammonia.**

An alcoholic solution of ammonia ( $\text{NH}_3$ ) containing 10 per cent., by weight, of the gas. It should be kept in glass-stoppered bottles, in a cool place.

A colorless, transparent liquid, having a strong odor of ammonia. Sp. gr.: 0.810 at 15° C.



Prepared by diluting stronger ammonia water with alcohol to the proper degree.

#### SPIRITUS AMMONIÆ AROMATICUS.

##### Aromatic Spirit of Ammonia.

It should be kept in glass-stoppered bottles, in a cool place.

A nearly colorless liquid when freshly prepared, but gradually acquiring a somewhat darker tint. It has a pungent, ammoniacal odor. Sp. gr., 0.905 at 15° C.

Prepared from ammonium carbonate, 34 Gm.; ammonia water, 90 Cc., etc., with alcohol and water to 1000 Cc.

#### ACTION.

The stimulant, alkalinizing, and antispasmodic action of ammonia.

#### USE.

Internally it may be used as a stimulant, and also as an antispasmodic. The aromatic spirit is the most agreeable of the ammonia preparations for internal administration.

#### AMMONII CARBONAS. $\text{NH}_4\text{HCO}_3\text{NH}_4\text{NH}_2\text{CO}_2$ .

##### Ammonium Carbonate. Sal Volatile.

It should be kept in well-stoppered bottles, in a cool place.

It is in the form of white, hard, translucent masses, having a strongly ammoniacal odor, a sharp, saline taste, and an alkaline reaction. On exposure to air the salt loses both ammonia and carbonic acid, becoming opaque, and finally a white powder. Soluble in 5 parts of water at 15° C. Alcohol dissolves the carbamate ( $\text{NH}_4\text{NH}_2\text{CO}_2$ ) and leaves the acid carbonate ( $\text{NH}_4\text{HCO}_3$ ) behind.

Prepared from a mixture of the ammonium sulphate or chloride, and calcium carbonate by sublimation. It is a mixture of ammonium carbamate and ammonium bicarbonate.

#### ACTION.

Ammonium carbonate acts like ammonia except that it is less rapid in producing an effect that is more prolonged.

#### USE.

Ammonium carbonate is used when a more prolonged stimulating effect is wanted than that produced by the ammonia preparations. It is more especially in asthenic diseases that it is indicated as a cardiac and respiratory stimulant.

**AMMONII CHLORIDUM.  $\text{NH}_4\text{Cl}$ .**

**Ammonium Chloride.** Muriate of Ammonia. Sal Ammoniac.

It is a white, crystalline powder; odorless, having a cooling, saline taste, and a neutral reaction; permanent in the air. Soluble in 3 parts of water at  $15^\circ \text{C}$ ; sparingly soluble in alcohol.

Prepared from gas liquor by adding hydrochloric acid and subliming in iron pots covered with leaden domes.

**ACTION.**

The ammonium chloride possesses almost no influence on the heart and respiration, but has a special action on mucous membrane, increasing the secretion of mucus. It also, like ammonia, increases the formation of glycogen in the liver.

**USE.**

Ammonium chloride may be used locally as a 10 per cent. solution in the treatment of bruises, inflammatory exudations, etc. Its property of increasing mucous secretion makes it useful in the treatment of chronic laryngitis, or of subacute or chronic bronchitis, alone or in combination with stimulating expectorants. In subacute gastric or intestinal catarrh, especially in children, it is of marked benefit in establishing a normal secretion. Because of its action in the liver it may be used in congestion, or in functional disturbance of this organ. It is considered a valuable remedy in the treatment of hepatic abscess. It seems to relieve neuralgic pains sometimes when other remedies fail. It is one of the many remedies that may be used in chronic rheumatism.

**LIQUOR AMMONII ACETATIS.**

**Solution of Ammonium Acetate.** Spirit of Mindererus.

An aqueous solution of ammonium acetate ( $\text{NH}_4\text{C}_2\text{H}_3\text{O}_2$ ) containing about 7 per cent. of the salt, together with small amounts of acetic and carbonic acids.

A clear, colorless liquid, of a mild saline, acidulous taste, and an acid reaction.

Prepared by adding ammonium carbonate to diluted acetic acid until it is neutralized.

**ACTION.**

The acetate (liquor) has a slight diaphoretic and diuretic action and may to a slight degree produce the characteristic effects of ammonia. It is a feeble drug at best.

**USE.**

The liquor ammonii acetatis which was formerly much used as a diaphoretic and diuretic is but little used now.

**AMMONII NITRAS.**  $\text{NH}_4\text{NO}_3$ .**Ammonium Nitrate.**

It should be kept in well-stoppered bottles.

It occurs in colorless crystals, or in fused masses; odorless, having a sharp, bitter taste, and a neutral reaction. It is somewhat deliquescent. Soluble, at  $15^\circ \text{C}$ ., in 0.5 part water, and in 20 parts of alcohol.

It may be obtained by heating commercial ammonium carbonate with nitric acid so long as effervescence takes place, filtering and evaporating the solution.

**ACTION.**

Analogous to that of potassium nitrate.

**USE.**

It has no therapeutic use.

**CALCIUM.** Ca.

A metal of the alkaline earths. The metal is not official.

*Sources.*—The chief sources are the carbonates, found native as chalk or lime stone.

*General Action of the Calcium Salts.*—These are of low diffusive power and are absorbed but slowly. They have a slight local tendency to diminish secretion, and a slight constitutional tendency to oppose degenerative processes in the tissues. Calx like potassa and soda is caustic, although to a less degree.

**PREPARATIONS.**

Calx . . . . .	For external use.
☉Calcii Hydras . . . . .	Pharmaceutical use.
Liquor Calcis . . . . .	15.00–60.00 Cc. $\frac{3}{4}$ –ij.
Linimentum Calcis . . . . .	For external use.
Syrupus Calcis . . . . .	1.90–3.75 Cc. $\frac{3}{4}$ –j.
Calcii Carbonas Præcipitatus . . . . .	0.30–0.95 Gm. gr. v–xv.
Creta Præparata . . . . .	0.30–0.95 Gm. gr. v–xv.
Mistura Cretæ . . . . .	3.75–7.50 Gm. zi–ij.
Pulvis Cretæ Compositus . . . . .	0.30–1.90 Gm. gr. v–xxx.
Trochisci Cretæ . . . . .	0.24 Gm. gr. iv.
Calcii Phosphas Præcipitatus . . . . .	0.30–0.95 Gm. gr. v–xv.
Calcii Chloridum . . . . .	Pharmaceutical use.
Calcii Sulphas Exsiccatus . . . . .	For external use.
Calx Chlorata . . . . .	See Chlorum.
Calx Sulphurata . . . . .	See Sulphur.
Calcii Bromidum . . . . .	See Bromum.
Calcii Hypophosphis . . . . .	See Phosphorus.
Potassa cum Calce . . . . .	See Potassa.

**CALX.**  $\text{CaO}$ .

**Lime.** Quick lime. Calcium Oxide.

It should be kept in well-closed vessels in a dry place.

It occurs in hard, white, or grayish-white masses, gradually attracting moisture and carbon dioxide on exposure to air, and falling to a white powder; odorless, having a sharp, caustic taste, and an alkaline reaction. Soluble in 750 parts of water at  $15^{\circ}\text{C}$ .; insoluble in alcohol.

It is obtained by calcining chalk or limestone, so as to expel carbon dioxide.

**ACTION.**

Calx is an escharotic when applied to a moist surface acting like potassa and soda, through its affinity for water. It does not burn deeply, however, because of the insoluble substance formed by its hydration (slaked lime).

**USE.**

If used it is as a caustic, generally in combination with potassa (Vienna paste) or soda (London paste) to diminish their destructive action on tissues.

**Φ CALCII HYDRAS.**  $\text{Ca}(\text{OH})_2$ .

**Calcium Hydrate.** Slaked lime.

It is a soft, white, bulky powder of a mawkish, alkaline taste. Sparingly soluble in water.

Obtained by adding moisture to lime.

The official preparations into whose composition it enters are defined simply as preparations of lime—*q. v.*

**Liquor Calcis.** Lime Water. Milk of Lime. Solution of Calcium Hydrate.

It is a saturated aqueous solution, and contains about .17 per cent. of calcium hydrate  $[\text{Ca}(\text{OH})_2]$ . A clear, colorless liquid, without odor, having a saline and feebly caustic taste, and an alkaline reaction.

Prepared by stirring lime with water; then allowing the undissolved lime to settle, and drawing off the clear liquid.

**ACTION.**

Lime water is a mild alkalinizer and a mild astringent.

**USE.**

It may be applied to granulating surfaces as a soothing dressing. As an enema to destroy seat worms—the empty bowel being thoroughly distended with the lime water.

Internally it is used as a mild alkalinizer in acid dyspepsia; in certain

forms of diarrhoea; in the artificial feeding of infants on cow's milk; in the use of milk diet for adults, etc.

### **Syrupus Calcis.** Syrup of Lime.

Composed of lime 65 Gm., sugar 400 Gm., water, 1000 Cc. (15 minims about equal  $\frac{1}{3}$ ss of lime water).

#### ACTION AND USE.

The same for internal administration as the liquor calcis with no advantages, but with some disadvantages.

### **Linimentum Calcis.** Carron Oil.

Composed of lime water and linseed oil. Equal parts.

#### ACTION AND USE.

Astringent, soothing and protectant. It may be used as a dressing for burns, ulcers, etc.

### **CALCII CARBONAS PRÆCIPITATUS.** $\text{CaCO}_3$ .

#### **Precipitated Calcium Carbonate.**

It is a very fine, white, impalpable powder, permanent in the air; odorless and tasteless. Insoluble in water or alcohol. Soluble in hydrochloric, nitric, or acetic acid with copious effervescence.

Prepared from the calcium chloride by precipitating with an excess of sodium carbonate. Represented by chalk, white marble, etc.

#### ACTION AND USE.

That of *creta præparata*—*q. v.*

### **CRETA PRÆPARATA.** $\text{CaCO}_3$ .

#### **Prepared Chalk.**

A white, amorphous powder, permanent in the air; odorless and tasteless. Insoluble in water or alcohol. Soluble in acids.

Prepared by simply freeing chalk of its impurities.

#### **Pulvis Cretæ Compositus.**

Compound chalk powder consists of prepared chalk 30, powdered acacia 20, and powdered sugar 50 parts. Used in preparing the *mistura cretæ*.

#### **Mistura Cretæ.** Chalk Mixture.

Composed of compound chalk powder 20, cinnamon water 40, water 40 parts. It should be freshly made when wanted for use.



## ACTION

Creta præparata and its preparations have the antacid and astringent properties of lime water. These properties are quite marked throughout the intestinal canal because of the insoluble character of chalk.

## USE.

In the treatment of diarrhœa dependent upon acid stools.

**CALCII CHLORIDUM.**  $\text{CaCl}_2$ .**Calcium Chloride.**

It should be kept in well-stoppered bottles. It is rendered anhydrous by fusion at the lowest possible temperature.

It occurs in colorless, slightly translucent, hard and friable masses, very deliquescent; odorless, having a hot, sharp, saline taste and a neutral or faintly alkaline reaction. Soluble at  $15^\circ \text{C}$ . in 1.5 parts of water, and in 8 parts of alcohol.

## ACTION.

Supposed to be that of an alterative.

## USE.

Practically it has no therapeutic use.

**CALCII PHOSPHAS PRÆCIPITATUS.**  $\text{Ca}_3(\text{PO}_4)_2$ .**Precipitated Calcium Phosphate.** Bone phosphate.

It is a light, white, amorphous powder, permanent in the air, odorless and tasteless. Insoluble in water or alcohol. Soluble in nitric or hydrochloric acid, without effervescence.

Prepared from bone ash by dissolving it in diluted hydrochloric acid, precipitating with ammonia and drying.

## ACTION.

Theoretically, this is a reconstructant resembling the hypophosphites (see phosphorus). Practically, it is of doubtful value.

## USE.

Theoretically, when there is a deficiency of this salt in the proper tissues, either from a diminished supply or from deficient assimilation, viz.: in rachitis, in ostiomalacia, etc. The official **syrupus calcii lactophosphatus** is a pleasant preparation for use to secure the action of the precipitated calcium phosphate.

## CALCII SULPHAS EXSICCATUS.

**Dried Calcium Sulphate.** Dried gypsum. Plaster-of-Paris.

A powder containing about 95 per cent., by weight, of calcium sulphate ( $\text{CaSO}_4$ ), and about 5 per cent. of water. It should be kept in well-closed vessels carefully protected from moisture. It is white, odorless, and tasteless.

With half its weight of water it forms a paste which rapidly hardens. Soluble in 410 parts of water at  $15^\circ \text{C}$ . ; insoluble in alcohol.

It exists native in several conditions, one of the chief being *gypsum* ( $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ ).

It may be prepared by precipitating a solution of calcium chloride with diluted sulphuric acid.

## USE.

It may be used in making permanent splints for fractures, dislocations, deformities, etc.

## STRONTIUM. Sr.

A rare metal, closely resembling calcium in appearance and properties. The metal is not official.

*Sources.*—It is found chiefly as a sulphate (celestine,  $\text{SrSO}_4$ ), or as a carbonate (strontianite,  $\text{SrCO}_3$ ). It may be contaminated by barium.

*General Action of the Strontium Salts.*—The strontium salts are anti-fermentative and germicidal. They improve the general nutrition; improve the appetite; and increase body weight. They increase the contractile power of muscular tissue, and through this action the heart's force is strengthened and arterial tension raised. All of the salts have a diuretic action, although not to a very marked degree.

## PREPARATIONS.

Strontii Lactas . . . . . 0.30–1.25 Gm. gr. v.–xx.

Strontii Bromidum . . . . . See Bromum.

Stronti Iodidum . . . . . See Iodum.

STRONTII LACTAS.  $\text{Sr}(\text{C}_3\text{H}_5\text{O}_3)_2 + 3\text{H}_2\text{O}$ .**Strontium Lactate.**

A white, granular powder; odorless, having a slightly bitter, saline taste, and an acid reaction. Soluble in about 4 parts of water at  $15^\circ \text{C}$ . ; soluble in alcohol.

## ACTION.

Strontium lactate has a sedative action on the heart in diseases of its valves or of its muscular tissue. It also reduces the amount of albumin present in certain forms of albuminuria.

## USE.

This salt is recommended in albuminuria due to renal atony, or to chronic parenchymatous nephritis.

**BARIUM.** Ba.

A metal of the alkaline earths with the color and lustre of silver. The metal is not official.

*Sources.*—It occurs in nature as a sulphate (heavy spar,  $\text{BaSO}_4$ ) or as a carbonate (witherite,  $\text{BaCO}_3$ ).

*General Action of the Barium Salts.*—These salts through their influence upon unstripped muscular fibres slow the heart's action; increase arterial tension; increase intestinal peristalsis; favor diuresis through their action upon the circulation; diminish atony of the bladder, etc.

## TOXICOLOGY.

Toxic doses cause arrest of the heart's action in systole due to overstimulation of the heart muscle. Still larger doses act as an irritant poison, causing nausea, vomiting, purging, collapse, and death.

*Treatment.*—The use of weak solutions of soluble sulphates, magnesium sulphate, sodium sulphate, etc., followed by demulcents.

## PREPARATIONS.

Barii Dioxidum . . . . .	Pharmaceutical use.
ϕ Barii Chloridum . . . . .	0.005–0.06 Gm. gr. $\frac{1}{12}$ –j.
ϕ Barii Iodidum . . . . .	00.1–0.06 Gm. gr. $\frac{1}{2}$ –j.

**BARII DIOXIDUM.**  $\text{BaO}_2$ .**Barium Dioxide.**

It should be kept in well-closed vessels.

It occurs as a heavy, grayish-white, or pale, yellowish-white, amorphous, coarse powder; odorless and tasteless. Almost insoluble in water, with which, however, it forms a definite hydrate, and to which it imparts a decidedly alkaline reaction.

It slowly attracts moisture and carbon dioxide, and is gradually decomposed.

## USE.

Pharmaceutically employed in making the official **aqua hydrogenii dioxidi**.

**BARII CHLORIDUM.**  $\text{BaCl}_2 + 2\text{H}_2\text{O}$ .**Barium Chloride.**

It occurs in colorless, transparent plates; odorless, with a nauseating, bitter taste. Soluble in 4 parts of water at  $15^\circ \text{C}$ . Sparingly soluble in alcohol.

It may be prepared from barium carbonate by treating it with hydrochloric acid.

#### ACTION.

The action of this salt is represented by the general action of the barium salts; that is, a muscular tonic.

#### USE.

It may be used in heart disease accompanied by impartial or deficient compensation. Also used in glandular enlargements.

### BARIUM IODIDE. $BaI_2$ .

#### Barium Iodide.

It should be kept in well-stoppered bottles.

It occurs in small, colorless needles, which deliquesce slightly, and are very soluble in water. The solution promptly undergoes decomposition by exposure to air, barium carbonate being precipitated and iodine set free.

It may be obtained by adding native barium carbonate to a boiling solution of ferrous iodide, or by decomposing a solution of barium sulphide with a concentrated alcoholic solution of iodine.

#### ACTION.

The action of this salt is that of barium rather than of the iodides.

#### USE.

Quite similar to that of the chloride.

### ALUMINUM. $Al$ .

It is a silver-white metal, very light (sp. gr. 2.56); unalterable in air; not acted on by sulphuric or nitric acid; not tarnished by sulphuretted hydrogen. It is dissolved by hydrochloric acid.

*Source.*—It occurs abundantly in nature in the form of a silicate, as in felspar and its associated minerals, and in the various modifications thence derived. The metal is not official.

*General Action of Aluminum Salts.*—The soluble salts precipitate albumin, constrict the tissues and diminish the calibre of the vessels at the point of application. They thus tend to check mild hemorrhages and to diminish secretion. If continued for some time they then act as an irritant, causing congestion of the parts and increasing secretion.

Internally the characteristic action already described is produced in the stomach. Large doses acting as an irritant cause emesis without much nausea. They have a destructive action on the teeth and should not be used as an astringent mouth wash. The insoluble salts have a protectant and mild astringent action.

## PREPARATIONS.

Alumen . . . . .	0.30-0.60 Gm., gr. v-x.
Alumen Exsiccatum . . . . .	For external use.
Alumini Hydras . . . . .	0.18-0.30 Gm., gr. iij-v.
Alumini Sulphas . . . . .	For external use.



**Potassium Alum.** Aluminum and Potassium Sulphate. Alum.

It occurs in large, colorless crystals, acquiring a whitish coating on exposure to air, due to absorption of ammonia; odorless, having a sweetish and strongly astringent taste, and an acid reaction. Soluble in 9 parts of water at 15° C.; freely soluble in warm glycerin; insoluble in alcohol.

Prepared generally from certain minerals which are called alum ores.

**Alumen Exsiccatum.** Dried Alum  $\text{Al}_2\text{K}_2(\text{SO}_4)_4$ .

This is alum with the water of crystallization driven off.

A white, granular powder attracting moisture when exposed to the air; odorless, having a sweetish, astringent taste. Very slowly, but completely soluble in 20 parts of water at 15° C.

## ACTION.

This is already described under the general action of the aluminum salts. The dried alum, through its affinity for water, has also a mild caustic action.

## USE.

Dried alum may be used locally to destroy unhealthy granulations. Alum may be used locally as a dusting powder, or in solution, to check mild hemorrhages; to diminish secretion from mucous membranes. It may be applied in solution to the skin to harden tissue and thus prevent the formation of bed sores. It may be applied in solution or as "alum curds" (prepared by adding powdered alum to milk until a curd is formed) over contusions to prevent ecchymosis.



**Aluminum Hydrate.** Aluminum Hydroxide.

It is a light, white, amorphous powder, permanent in dry air; odorless, tasteless, and insoluble in water or alcohol.

It is prepared by precipitation, by pouring a boiling hot, aqueous, solution of alum into a hot solution of sodium carbonate. The precipitate thus formed—the hydroxide—is then washed with hot, distilled water, drained, dried, and pulverized.

## ACTION.

Absorbent and protectant like the insoluble bismuth salts, mildly ant-acid like magnesia.



## USE.

Locally, it may be used as a dusting powder upon superficial burns, ulcers, etc.

Internally it is sometimes used in the treatment of dyspepsia, diarrhoea, etc.

**ALUMINI SULPHAS.**  $\text{Al}_2(\text{SO}_4)_3 + 16\text{H}_2\text{O}$ .**Aluminum Sulphate.**

It is a white, crystalline powder, permanent in the air; odorless, having a sweetish, and afterward astringent, taste, and an acid reaction. Soluble, with a trifling residue, in 1.2 parts of water at  $15^\circ \text{C}$ .; insoluble in alcohol.

Prepared by the action of sulphuric acid on alumen.

## ACTION.

It has the action of a mild caustic in saturated solution. It is also astringent and mildly antiseptic.

## USE.

Locally, it may be used in the treatment of indolent ulcers.

**CERII OXALAS.**  $\text{Ce}_2(\text{C}_2\text{O}_4)_3 + 9\text{H}_2\text{O}$ .**Cerium Oxalate.**

Dose, 0.06–0.60 Gm. gr. j–x.

It is a white, granular powder, permanent in the air; odorless, tasteless; insoluble in water or alcohol.

It is prepared by precipitating some soluble salt of cerium with ammonium oxalate.

## ACTION.

Cerium oxalate has a sedative action in allaying local nervous irritability. In a general way it resembles the insoluble bismuth salts in action.

## USE.

It may be used to control reflex nausea and vomiting, especially the vomiting of pregnancy.

**MAGNESIUM.** Mg. /

A white metal, malleable, almost as volatile as zinc, and can therefore be purified by distillation. Heated in the air it burns and produces magnesia, which is its only oxide. The metal is not official.

*General Action of the Magnesium Salts.*—The sparingly soluble salts have a mild antacid action. The soluble salts act as saline cathartics.

## PREPARATIONS.

Magnesia . . . . .	0.30- 3.75 Gm. gr. v- $\text{z}\text{i}$ .
Magnesia Ponderosa . . . . .	0.30- 3.75 Gm. gr. v- $\text{z}\text{i}$ .
Magnesium Carbonas . . . . .	0.30- 3.75 Gm. gr. v- $\text{z}\text{i}$ .
Magnesium Citras Effervescens . . . . .	3.75-15.00 Gm. $\text{z}\text{i}$ -iv.
Liquor Magnesium Citratis . . . . .	120.00-360.00 Cc. $\text{z}\text{iv}$ - $\text{xij}$ .
Magnesium Sulphas . . . . .	7.50-30.00 Gm. $\text{z}\text{ij}$ - $\text{z}\text{i}$ .

**MAGNESIA.** MgO.**Calcined Magnesia.** Light Magnesia.

It should be kept in well-closed vessels.

It occurs as a white, very light and fine powder, slowly absorbing moisture and carbon dioxide from the air; odorless, having an earthy but not saline taste, and a faintly alkaline reaction. Almost insoluble in water and insoluble in alcohol, but soluble in dilute acids.

Prepared from magnesium carbonate by exposing it to a low red heat until all the carbon dioxide is driven off. According to special circumstances in making, magnesia may be comparatively light or heavy.

## ACTION.

Magnesia is a mild antacid. Used internally a part is changed by the gastric juice into salts which act as a mild laxative. Some of this magnesia in its changed form may be absorbed and produce a mild alkalinizing action throughout the system, and along the lines of elimination. Magnesia which passes through the stomach unchanged will act as an antacid in the intestinal canal. If large quantities of magnesia are taken habitually concretions sufficient to obstruct the bowels may be formed.

## USE.

It may be used as an antacid in certain forms of dyspepsia; in infantile diarrhoea attended by acid stools; in the dyspepsia and vomiting of pregnancy.

It is also used as an antidote in arsenical poisoning.

**MAGNESIA PONDEROSA.** MgO.**Heavy Magnesia.**

A white, dense, and very fine powder, which should conform to the tests and reactions of magnesia.

The ratio of weight of magnesia to magnesia ponderosa is as 1 to  $3\frac{1}{2}$ .

## ACTION AND USE.

Magnesia ponderosa has practically the same action and use as has magnesia.

**MAGNESII CARBONAS.**  $(\text{MgCO}_3)_4\text{Mg}(\text{OH})_2 + 5\text{H}_2\text{O}$ .**Magnesium Carbonate.** *Magnesia Alba.*

A light, white powder; odorless and tasteless; almost insoluble in water, insoluble in alcohol. It is a compound of normal magnesium carbonate and magnesium hydrate.

Prepared from magnesium sulphate by precipitating with sodium carbonate, using hot, concentrated solutions.

**ACTION.**

Magnesium carbonate has much the same action as magnesia. On coming in contact with the acid gastric juice carbon dioxide is evolved, and this may give rise to unpleasant eructations.

**USE.**

Quite similar to that of magnesia.

**MAGNESII CITRAS EFFERVESCENS.****Effervescent Magnesium Citrate.**

It must be kept in well-closed vessels.

A white, coarsely granular salt, deliquescent on exposure to air; odorless, having a mildly acidulous, refreshing taste, and an acid reaction. Soluble, with copious effervescence, in 2 parts of water at  $15^\circ \text{C}$ . Almost insoluble in alcohol.

Prepared by mixing magnesium carbonate, sodium carbonate, and citric acid together.

**Liquor Magnesii Citratis.** Solution of Magnesium Citrate.

It contains of magnesium carbonate 15 Gm. in 360 Cc.

Prepared by adding magnesium carbonate to a solution of citric acid and flavoring with syrup of citric acid.

An acidulous, sweetened and actively effervescing solution not unpleasant to the taste.

**ACTION.**

Magnesium citrate acts as a mild saline purgative. It has rather a pleasant taste, and is generally well borne by the stomach.

**USE.**

It may be used where saline laxatives are indicated, as a depletant, or to unload the bowels; hence, in dropsy, in enteritis, in peritonitis.

**MAGNESII SULPHAS.**  $\text{MgSO}_4 + 7\text{H}_2\text{O}$ .**Magnesium Sulphate.** Epsom Salts.

It occurs in colorless prisms, or acicular crystals, slowly efflorescent in dry air; odorless, having a cooling, saline and bitter taste, and a neutral

reaction. Soluble in 1.5 parts of water at 15° C.; insoluble in alcohol. This is a widely distributed salt, being an ingredient of sea water, and of the water of some saline springs. It also occurs native. It may be prepared from dolomite (magnesian lime stone) by dissolving it in sulphuric acid.

#### ACTION.

Magnesium sulphate is a typical saline purgative, increasing secretion, increasing the amount of fluid present in the intestinal canal, and, by distension, increasing peristalsis. It must be remembered that concentrated solutions are required to secure a purgative action, for these only are the ones that abstract fluid from the tissues when brought in contact with them. Small, repeated and well-diluted doses of magnesium sulphate act as a diuretic.

#### USE.

It may be used when a saline cathartic is wanted as a depletant; as in dropsy, enteritis, peritonitis, etc., or to empty the bowel simply.

### ZINCUM. Zn.

#### Zinc.

Metallic zinc in the form of thin sheets, or in irregular, granulated pieces, or in a state of fine powder.

A bluish-white metal, soluble in diluted sulphuric or hydrochloric acid with evolution of hydrogen gas.

*Sources.*—It is obtained by washing zinc blende, or calamine, to drive off sulphur or carbon dioxide, and then distilling the oxide with charcoal.

*General Action of the Zinc Salts.*—The soluble salts coagulate albumin, thus acting as astringents. Internally large doses of the soluble salts by their irritant action cause prompt emesis with but little nausea. Small doses act as astringents at the point of application and along the lines of elimination. They also act as a tonic to the nervous system, and tend to the abatement of spasmodic nervous disorders.

#### TOXICOLOGY.

All of the salts when taken for a long time in excess produce organic changes in the nervous system characterized by burning superficial pains, increased reflex activity, and other symptoms of myelitis. Poisoning from zinc, either in the acute or chronic form, is rare. The salts of zinc cause death by their action on the heart and muscles of respiration, without influencing to any great extent the central nervous system.

*Treatment.*—In chronic poisoning remove the cause and hasten elimination.

## PREPARATIONS.

Zinci Oxidum . . . . .	0.12-0.30 Gm. gr. ij-v.
Oleatum Zinci . . . . .	For external use.
Unguentum Zinci Oxidi . . . . .	For external use.
Zinci Acetas . . . . .	For external use.
Zinci Carbonas Præcipitatus . . . . .	For external use.
Zinci Chloridum . . . . .	For external use.
Liquor Zinci Chloridi . . . . .	For external use.
Zinci Sulphas . . . . .	0.06-1.90 Gm. gr. i-xxx.
Zinci Bromidum . . . . .	See Bromum.
Zinci Iodidum . . . . .	See Iodum.
Zinci Phosphidum . . . . .	See Phosphorus.
Zinci Valerianas . . . . .	See Valerian.

ZINCI OXIDUM.  $ZnO$ .**Zinc Oxide.**

It should be kept in well-stoppered bottles.

It is an amorphous, white powder, without odor or taste. It gradually absorbs carbon dioxide from the air. Insoluble in water or alcohol. Soluble, without effervescence, in diluted acids; also in ammonia water.

It may be prepared from zinc carbonate by calcining.

**Unguentum Zinci Oxidi.** Zinc ointment contains 20 per cent. of zinc oxide in benzoated lard.

**Oleatum Zinci.** Oleate of zinc is prepared by treating 5 parts of zinc oxide with oleic acid.

## ACTION.

Locally zinc oxide is protective and astringent.

Internally it has a similar action, but in addition, through chemical action that may take place, there may also be a mild tonic and sedative action exercised upon the nervous system.

## USE.

Zinc oxide may be used locally as a dusting powder or as an ointment in the treatment of many forms of skin disease, indolent ulcers, burns, etc.

Internally it may be used in the treatment of chronic diarrhœa, the night-sweating of debility, etc. /

## ZINCI CARBONAS PRÆCIPITATUS.

**Precipitated Zinc Carbonate.**

An impalpable, white powder, of somewhat variable chemical composition, without odor or taste. Permanent in the air. Insoluble in water



or alcohol; soluble in diluted acids with copious effervescence; also soluble in ammonia water.

Prepared from zinc sulphate by precipitating with sodium carbonate.

#### ACTION.

This salt has much the same action as has the zinc oxide.

#### USE.

By some prescribers the zinc carbonate is preferred to the zinc oxide as a protectant dressing for burns, chronic ulcers, erysipelas, etc.

#### ZINCI SULPHAS. $\text{ZnSO}_4 + 7\text{H}_2\text{O}$ .

**Zinc Sulphate.** White Vitriol.

It should be kept in well-stoppered bottles.

It occurs in small, colorless crystals, slowly efflorescing in dry air; odorless, having an astringent, metallic taste, and an acid reaction. Soluble in 0.6 part of water at  $15^\circ \text{C}$ .; also soluble in 3 parts of glycerin; insoluble in alcohol.

Prepared from zinc by dissolving it in sulphuric acid, and purifying, in the same way as in preparing the chloride.

#### ACTION.

This, a soluble zinc salt, combines with albumin and forms an insoluble albuminate. It has thus an astringent action. It is also irritant and mildly antiseptic. Internally, small doses have at first a tonic and sedative action upon the nervous system; if long continued a depressant action follows. A large dose, through its irritant action, produces prompt emesis, without depression.

#### USE.

A weak solution ( $\frac{1}{3}$  to  $\frac{2}{5}$  per cent.) may be used locally in the treatment of inflammations of mucous membrane; as in conjunctivitis, gonorrhœa, etc. Stronger solutions (1 to 2 per cent.) may be used for their stimulating and astringent action in certain chronic inflammations; as in certain chronic skin diseases.

Internally, it has a limited use for the general tonic and sedative action of the zinc salts in the treatment of certain nervous diseases, hysteria, etc.

A large dose (0.30–1.90 Gm.—5 to 30 grs.) may be given as an emetic where it is necessary to empty the stomach promptly.

#### ZINCI ACETAS. $\text{Zn}(\text{C}_2\text{H}_3\text{O}_2)_2 + 2\text{H}_2\text{O}$ .

**Zinc Acetate.**

It should be kept in well-stoppered bottles.

It occurs in soft, white plates, of a pearly lustre, having a faintly

acetous odor, an astringent, metallic taste, and a slightly acid reaction. Soluble, at 15° C., in 2.7 parts of water, and in 36 parts of alcohol.

Prepared from zinc carbonate by dissolving it in acetic acid.

#### ACTION.

Quite the same as that of the sulphate, with no advantages.

#### USE.

The same as that of the sulphate.

### ZINCI CHLORIDUM. $\text{ZnCl}_2$ .

**Zinc Chloride.** Butter of Zinc.

It should be kept in small, glass-stoppered bottles.

A white, granular powder, or porcelain-like masses, irregular, or moulded into pencils; odorless; of such intensely caustic properties as to make tasting dangerous unless the salt be dissolved in much water, when it has an astringent, metallic taste. Very deliquescent. Soluble in 0.3 part of water at 15° C.; very soluble in alcohol. Its reaction is acid.

Prepared from zinc by dissolving in hydrochloric acid, then purifying from lead or iron that may be present.

**Liquor Zinci Chloridi.**—Solution of Zinc Chloride. An aqueous solution of zinc chloride containing about 50 per cent., by weight, of the salt.

#### ACTION.

Zinc chloride has a marked caustic action when applied to a denuded surface. It burns deeply through its affinity for water, in spite of the fact that it forms an insoluble albuminate, which tends to limit its caustic properties. It is also astringent and disinfectant.

#### USE.

As "Canquoin's Paste" (Zinc chloride 1 part; Starch 2, 3, or 4 parts; with a sufficient quantity of water), or as the official *liquor*, it is a valuable escharotic in the treatment of malignant growths, where operation is not advisable. It coagulates the blood in the vessels, and converts the soft tissues into a tough, dry, and uniform mass, which is not foetid and which separates, leaving a clean, granulating surface, which tends to heal rapidly. Other uses may be made of these preparations for their escharotic properties.

The official *liquor zinci chloridi* may be used (1 to 5 per cent. solutions) as a disinfectant and deodorant for vaults, sinks, water-closets, etc. It will not destroy spores.

## TOXICOLOGY.

The symptoms produced by toxic doses of zinc salts are those of intense irritation, often followed by collapse and death.

*Treatment.*—Sodium carbonate as a chemical antidote. Other treatments must be symptomatic.

## CUPRUM. Cu.

**Copper.**

A metal possessing a characteristic red color. The metal is not official.

*Sources.*—Its chief source is copper pyrites, which is a double sulphite of copper and iron.

*General Action of the Copper Salts.*—Locally, soluble copper salts are irritant and astringent, and mildly caustic. Applied in concentrated form to a moist surface, they combine with the albuminous elements of the tissues, forming a thin slough, and at the same time constricting and irritating the parts. The caustic effect is but slight, and the local action is practically that of an astringent and irritant. Such action may be sufficient to promote absorption of easily-absorbed tissues, such as granulations; it may also promote the healing of indolent ulcers, or the abatement of catarrhal processes.

Internally, small doses act as nervous sedatives, after the manner of soluble zinc salts. A large dose will produce prompt and free vomiting, attended with little nausea or depression. Still larger doses act as irritant poisons.

## TOXICOLOGY.

The symptoms produced by toxic doses of copper salts are those of an irritant poison. Death may be preceded by insensibility, convulsions, or paralysis.

*Treatment.*—Give albumin in the form of white of eggs, or milk. This forms with the soluble copper salt nearly insoluble albuminates. Potassium ferrocyanide is a useful antidote, forming a ferrocyanide of copper, which is quite insoluble. The after-treatment is symptomatic.

## PREPARATIONS.

Cupri Sulphas, . . . . . 0.02–0.30 Gm.—gr.  $\frac{1}{3}$ –v.  
 ☉ Cupri Arsenitis, . . . . . See Arsenic.

CUPRI SULPHAS.  $\text{CuSO}_4 + 5\text{H}_2\text{O}$ .**Copper Sulphate.** Blue Vitriol. Blue-stone.

It is in the form of large, translucent, deep blue crystals, efflorescent; odorless, having a nauseous, metallic taste, and an acid reaction. Soluble in 2.6 parts of water at 15° C.; almost insoluble in alcohol.

Prepared from copper by heating the metal, or its oxide, with sulphuric acid, dissolving in water, and crystallizing.

#### ACTION.

Copper sulphate is more irritant and astringent than is zinc sulphate. It is also slightly caustic. Its general action is much the same as that of the soluble zinc salts, viz.: astringent and antiseptic locally, with a tonic and sedative action upon the nervous system when used internally in small doses for a short time, but depressing when continued too long.

#### USE.

Locally as a wash (1 to 2 per cent. solution) to chronic indolent ulcers. In the crystalline or stick form it may be applied to exuberant granulations. Its internal use is extremely limited, other drugs being more efficient.

#### ARGENTUM. Ag.

##### Silver.

This is a pure white brilliant metal, tolerably soft and very ductile. The metal is not official.

*Sources.*—Silver occurs native. Its most important ores are silver sulphide and various compounds with sulphur, arsenic antimony, copper, and other metals.

*General Action of the Silver Salts.*—The local action of silver salts differs with the different preparations, according to their solubility. The constitutional action is that of a tonic and sedative to some parts of the nervous system. When taken for some time there is a tendency to a bluish-black discoloration of the skin and mucous membrane. This staining is known as argyria.

#### TOXICOLOGY.

The symptoms produced by an overdose of soluble silver salt are those of an irritant poison, namely, severe burning pains in the stomach and intestines, vomiting and diarrhoea.

*Treatment.*—Common salt should be used as a chemical antidote, and this followed by an abundance of milk.

#### PREPARATIONS.

Argenti Iodidum . . . . .	0.06–0.12 Gm. gr. j–ij.
Argenti Oxidum . . . . .	0.06–0.12 Gm. gr. j–ij.
Argenti Nitras . . . . .	0.01–0.03 Gm. gr. $\frac{1}{6}$ – $\frac{1}{2}$ .
Argenti Nitras Fusus . . . . .	For external use.
Argenti Nitras Dilutus . . . . .	For external use.
Argenti Cyanidum . . . . .	For pharmaceutical use.

**ARGENTI NITRAS.**  $\text{AgNO}_3$ .**Silver Nitrate.**

It should be kept in dark amber-colored vials, protected from light.

It occurs in colorless, transparent, tabular crystals, becoming gray, or grayish-black, on exposure to light in the presence of organic matter; odorless, having a bitter, caustic, and strongly metallic taste, and a neutral reaction. Soluble, at  $15^\circ \text{C.}$ , in 0.6 part of water and in 26 parts of alcohol.

Prepared by treating silver with nitric acid.

**Argenti Nitras Fusus.** Lunar Caustic.

Obtained by melting nitrate of silver in a porcelain capsule at as low a temperature as possible, then adding to it gradually hydrochloric acid (4 parts to 100); stirring well, and when nitrous vapors cease to be evolved, pouring the melted mass into suitable moulds. The product should be kept in dark amber-colored vials, protected from the light.

It is a white, hard solid, in the form of pencils or cones. Soluble, at  $15^\circ \text{C.}$ , with the exception of about 5 per cent. of silver chloride, in 0.6 part of water, and in 26 parts of alcohol. In other respects it resembles silver nitrate.

**Argenti Nitras Dilutus.** Mitigated Stick.

Prepared by melting together in a porcelain crucible, at as low a temperature as possible, 30 Gm. of silver nitrate and 60 Gm. of potassium nitrate, stirring the melted mass until it flows smoothly, then pouring it into suitable moulds.

It is a white, hard solid, in the form of pencils or cones, having the general characteristics of silver nitrate.

**ACTION.**

Silver nitrate (practically the only silver salt used), like the soluble salts of zinc and copper, combines with albumin, forming an insoluble albuminate. It is caustic, but self-limiting in action. In diluted form it is irritant or stimulant, according to the degree of dilution. Through its action on albumin it is astringent and hæmostatic, and this effect is increased by the irritant action of the drug, which tends to cause contraction of the smaller blood-vessels. It is also antiseptic.

The constitutional action of silver is that of a tonic and sedative to the nervous system.

**USE.**

Locally, for its stimulant and astringent action. It may be applied to chronic ulcers in strong solution (12 to 20 per cent.), or in the form of a crayon: to slowly granulating surfaces ( $\frac{1}{2}$  to 1 per cent. solution) to



prove the cicatrization; in subacute or chronic catarrh ( $\frac{1}{2}$  to 5 per cent. solution); in the abortive treatment of quinsy a strong solution (10 to 20 per cent.) is sometimes applied to the affected tonsil. As a prophylactic against ophthalmia neonatorum a few drops of a one-half to one per cent. solution may be used. In chronic conjunctivitis a weak solution ( $\frac{1}{2}$  to 2 per cent.) may be applied to the everted lid; but this should be neutralized with a solution of common salt before the lid is replaced. Silver nitrate is not well borne by the cornea, and may cause permanent opacity when corneal ulcers are present. To prevent the formation of a bed sore a two per cent. solution may be painted over the unbroken, but reddened, skin.

A weak solution (1 in 4,000 to 1 in 2,000) holds a prominent place with some prescribers as an injection in the treatment of gonorrhœa.

In dysentery a weak solution ( $\frac{1}{8}$  to  $\frac{1}{4}$  per cent.) may be used as an enema, after having previously cleansed the bowels by means of a warm-water enema. Soap or salt must not be used in this preliminary enema, as either of them will prevent the action of the silver.

Internally silver nitrate may be used in the treatment of gastric ulcer, and, in pill form, if coated with keratin or shellac, in intestinal ulceration.

#### ARGENTI OXIDUM. $\text{Ag}_2\text{O}$ .

##### Silver Oxide.

It should be kept in dark amber-colored vials.

A heavy, dark, brownish-black powder, liable to reduction by exposure to light; odorless, having a metallic taste, and imparting an alkaline reaction to water, in which it is very sparingly soluble. It is soluble in alcohol. It should not be triturated with readily combustible or oxidizable substances, and should not be brought in contact with ammonia.

It is prepared from silver nitrate.

#### ACTION.

Silver oxide has the general action of the nitrate, but to a less marked degree.

#### USE.

Internally after the manner of the nitrate.

#### ARGENTI IODIDUM. $\text{AgI}$ .

##### Silver Iodide.

It should be kept in dark amber-colored vials, protected from light.

A heavy, amorphous, light-yellowish powder; unaltered by light, if pure; without odor or taste, and insoluble in water or alcohol.

Prepared by adding silver nitrate to potassium iodide.

#### ACTION.

Internally the same as that of the nitrate, or of the oxide.

## USE.

Practically it has no use, as it is an uncalled-for preparation.

**ARGENTI CYANIDUM.** AgCN.**Silver Cyanide.**

It should be kept in dark amber-colored vials, protected from light.

A white powder, permanent in dry air, but gradually turning brown on exposure to light, odorless and tasteless, insoluble in water or alcohol.

## USE.

Pharmaceutically this salt is used in preparing the diluted hydrocyanic acid.

**PLUMBUM.** Pb.

A metal. As such it is not official.

*Source.*—The chief source is the native sulphide (galenite), from which it is obtainable by washing.

*General Action of the Lead Salts.*—Locally the insoluble salts are soothing and protectant. The soluble salts combine with albumin, forming an insoluble albuminate, and thus exercise an astringent action. At the same time these soluble salts are far less irritant than most other astringent metallic salts. Absorbed, the lead salts exert a peculiar perverting and deteriorating influence upon the tissues.

## TOXICOLOGY.

Poisonous symptoms are not apt to arise during the medicinal use of lead preparations, but acute poisoning may follow the administration of a large dose of lead acetate, and chronic poisoning may result from the medicinal use, or from accidental absorption of lead salts.

The symptoms of acute poisoning are those of irritation, namely; pain in the stomach and bowels, nausea, emesis, and diarrhoea.

*Treatment* consists in the use of emetics, or of the syphon tube, if emesis has not already occurred, and the administration of magnesium sulphate as a chemical antidote.

Chronic poisoning may occur among those working with lead; as workmen in the type foundries, type-setters, indoor painters. Drinking water that has been conducted through lead pipes may also serve as a cause.

The symptoms of chronic poisoning are anæmia; blue lines (*a*) on the gums; (*b*) in the gums; colic, preceded and accompanied by symptoms of indigestion, constipation, etc.; lead palsy, as shown in the characteristic "wrist drop;" cerebral disturbances, as shown by epileptic convulsions, acute delirium, tremors, etc.

*Treatment.*—(1) Prophylactic. Remove the cause if possible; cleanli-

ness about the person ; the use of a respirator when necessary. (2) Eliminative. Potassium iodide to hasten elimination ; magnesium sulphate in purgative doses, both for its chemical and eliminative action. (3) Symptomatic. To relieve the pain morphine hypodermatically may be necessary. For the paralysis, massage, electricity, and strychnine may be used.

## PREPARATIONS.

Plumbi Acetas . . . . .	0.06-0.18 Gm.—gr. j-ijj.
Liquor Plumbi Subacetatis . . . .	For external use.
Liquor Plumbi Subacetatis Dilutus .	For external use.
Ceratum Plumbi Subacetatis . . . .	For external use.
Plumbi Carbonas . . . . .	For external use.
Unguentum Plumbi Carbonatis . . .	For external use.
Plumbi Iodidum . . . . .	0.03-0.18 Gm.—gr. ½-ijj.
Unguentum Plumbi Iodidi . . . . .	For external use.
Plumbi nitras . . . . .	For external use.
Plumbi Oxidum . . . . .	For external use.
Emplastrum Plumbi . . . . .	For external use.
Unguentum Diachylon . . . . .	For external use.

**PLUMBI ACETAS.**  $\text{Pb}(\text{C}_2\text{H}_3\text{O}_2)_2 \cdot 3\text{H}_2\text{O}$ .

**Lead Acetate.** Sugar of Lead.

It should be kept in well-stoppered bottles.

It occurs in colorless, transparent, shining, prismatic crystals, or plates, or as a heavy, white, crystalline mass, or as granular crystals ; efflorescent, and attracting carbon dioxide on exposure to air ; having a faintly acetous odor, a sweetish, astringent, afterward metallic taste, and a faintly acid reaction. Soluble, at  $15^\circ \text{C}$ ., in 2.3 parts of water and in 21 parts of alcohol.

Prepared by dissolving lead oxide in acetic acid.

**Liquor Plumbi Subacetatis.** (Goulard's Extract.) Contains about 25 per cent. of lead subacetate. It should be kept in well-stoppered bottles.

This is a clear, colorless liquid, of a sweetish, astringent taste, and an alkaline reaction.

Prepared from lead acetate, 170 parts, lead oxide, 120 parts, distilled water to 1000 parts.

**Liquor Plumbi Subacetatis Dilutus** (Lead water) contains 3 per cent. of the solution of lead subacetate in water.

**Ceratum Plumbi Subacetatis** (Goulard's Cerate) consists of

Goulard's Extract 1 part, cerate of camphor 4 parts. It should be freshly prepared when wanted.

#### ACTION.

This soluble salt unites with albumin, forming an insoluble albuminate, and thus acts as an astringent. It has a slight irritating action upon denuded surfaces, or on mucous membranes. In the stomach a large dose may cause vomiting. Small doses may have a sedative action upon the nervous system. Continued doses may give rise to symptoms of chronic lead poisoning.

#### USE.

Solutions of subacetate of lead have long been used for their sedative and astringent action in the treatment of superficial inflammations; in skin diseases; etc.

Internally, lead acetate is used alone, or in combination with opium, in the treatment of chronic diarrhœa; chronic dysentery; etc.

### PLUMBI IODIDUM. $PbI_2$ .

#### Lead Iodide.

It should be kept in well-stoppered bottles, protected from light.

It is a heavy, bright, citron-yellow powder, permanent in the air; odorless, tasteless, and of a neutral reaction. Soluble in about 2000 parts of water; very sparingly soluble in alcohol.

Prepared by mixing solutions of lead nitrate and potassium iodide.

**Unguentum Plumbi Iodidum.** Ointment of Lead Iodide. This consists of ten per cent. lead iodide with benzoated lard.

#### ACTION.

Lead iodide has the action of a slightly soluble lead salt.

#### USE.

But little used.

### PLUMBI NITRAS. $Pb(NO_3)_2$ .

#### Lead Nitrate.

It occurs in colorless, transparent or white, nearly opaque crystals, permanent in the air; odorless, having a sweetish, astringent, afterward metallic taste, and an acid reaction. Soluble in 2 parts of water at  $15^\circ$  C.; almost insoluble in alcohol.

Prepared by dissolving lead in nitric acid, with the aid of heat, and crystallizing.

#### ACTION.

Lead nitrate has the general astringent action of the acetate; at the same time it is more of an irritant. It decomposes sulphuretted compounds and thus proves deodorant to parts generating foul secretions.

## USE.

As a deodorant in the form of a dusting powder, or solution (2 to 5 per cent.) it may be used upon sloughing, or indolent ulcers.

**PLUMBI OXIDUM.**  $PbO$ .

**Lead Oxide.** Litharge.

It should be kept in well-closed vessels.

It occurs as a heavy, yellowish, or reddish-yellow powder, or as minute scales; permanent in the air; odorless, and tasteless. Almost insoluble in water; insoluble in alcohol.

Prepared by washing lead in a current of air.

**Emplastrum Plumbi.** Lead Plaster. (Diachylon Plaster.) Composed of  $\frac{1}{3}$  litharge and  $\frac{2}{3}$  olive oil.

**Unguentum Diachylon.** Diachylon Ointment. Composed of lead plaster 50, olive oil 49, and oil of lavender 1 part.

## ACTION.

Lead oxide being insoluble has only a local protectant action. If, through chemical action, a part of it is converted into a soluble salt, the effect would then be that of other soluble salts of lead.

## USE.

Its principal use is in the treatment of various skin diseases, in the form of the official ointment or plaster; or as Hebra's diachylon ointment.

**PLUMBI CARBONAS.**  $(PbCO_3)_2 Pb(OH)_2$ .

**Lead Carbonate.** White lead.

It should be kept in well-closed bottles.

A heavy, white, opaque powder, or a pulverulent mass; permanent in the air; odorless, and tasteless. Insoluble in water, or alcohol.

Prepared by exposing lead to the fumes of vinegar and carbon dioxide.

**Unguentum Plumbi Carbonatis.** Ointment of Lead Carbonate. This consists of ten per cent. lead carbonate, with benzoated lard.

## ACTION AND USE.

Quite similar to that of the lead oxide.

**HYDRARGYRUM.** Hg.

**Mercury.** Quicksilver.

It should be kept in strong, well-stoppered bottles.



It is a shining, silver-white metal; liquid at temperatures above  $-40^{\circ}\text{C}$ . Odorless, tasteless, and insoluble in ordinary solvents, but soluble in nitric acid without residue. Sp. gr.: 13.5584 at  $15^{\circ}\text{C}$ . It volatilizes very slowly at ordinary temperature, but more rapidly as the temperature increases, and at  $357.25^{\circ}\text{C}$ . ( $675.05^{\circ}\text{F}$ .) it boils, and is completely volatilized, yielding a colorless and very poisonous vapor. When globules of mercury are dropped upon white paper, they should roll about freely, retaining their globular form and leaving no streaks or traces behind them.

*Sources.*—It occurs native in the free state; also in the form of cinnabar (red sulphide of mercury), from which it is obtained by roasting, either alone or with iron or lime.

The mercurial preparations may be divided into three classes for convenience in studying: Those containing mercury in the metallic state; the mercurous compounds; and the mercuric compounds.

*General Action of Mercurial Preparations.*—Metallic mercury, the mercurous and the mercuric salts all have local actions differing from one another, but after absorption their general action is the same. Metallic mercury, when applied to the skin either in the form of vapor (by fumigation) or in a finely divided state as in an ointment (by inunction), will be absorbed, in a changed or unchanged form, without exciting any local action. The mercurous salts have a slightly more stimulating local action than has the metal. The mercuric salts unite with albumin, forming an albuminate which is insoluble in water, but readily soluble in an excess of albumin or in a solution of common salt. The insoluble mercuric salts have little action upon the unbroken skin, but the soluble mercuric salts are both irritant and caustic in action. When swallowed in too large a dose the soluble mercuric salts will cause gastro-enteritis.

In the system mercury exists probably as an oxide in combination with albumin—an oxyalbuminate of mercury. Mercury has a so-called alterative action, and this is due to the fact that after absorption it is brought in contact with the protoplasmic cells. These cells are stimulated to greater activity in their attempt to eliminate this protoplasmic poison (for such it is). This means increased discharge of katabolic products, together with renewed activity in the building-up process. Mercury has a specific action in destroying the virus of syphilis, but this specific property is not yet understood; possibly it may depend entirely upon increased cell activity, and increased elimination of waste products. Certain preparations of mercury act as laxatives, and by increasing peristalsis of the small intestines prevent the reabsorption of bile, thus acting as indirect cholagogues. The direct cholagogue properties of mercury have been disputed, but there is good reason to believe that while the chief cholagogue action is indirect, it has also a direct cholagogue action during its elimina-

tion through the liver. For local antiseptics we confine ourselves to the use of soluble mercuric salts, but any of the mercurial preparations may undergo such chemical change as to become antiseptic in action at the seat of application, or along the lines of elimination. Mercury acts as a diuretic, and through the irritation that it produces may possibly cause nephritis when the drug is continued for a long time. The elimination of mercury is carried on by the liver, kidneys, salivary glands, skin, bronchial, and intestinal mucous membranes, and there may be direct stimulation of these parts, attended by increased functional activity.

### TOXICOLOGY.

Metallic mercury is not poisonous, but the metal may be rapidly converted into a soluble salt after absorption. The soluble salts of mercury in large doses act as irritants, giving rise to symptoms of acute poisoning (see corrosive sublimate poisoning). Slow poisoning—known also as mercurialism—is the result of (*a*) inhalation of the vapor or absorption of the metal through the skin by those engaged in mining or smelting the ores of mercury, or working amalgams; (*b*) the continuous administration medicinally of some mercurial preparation in such quantity that elimination cannot keep pace with absorption and a “storing up” of mercury in the system follows.

The symptoms of mercurialism are, a disagreeable odor with the breath; a sensation of soreness of the teeth when the jaws are brought forcibly together; a disagreeable metallic taste; the gums become swollen, bleed easily, and have a bluish line along their margins; the saliva, which at first was thin and watery, becomes tenacious; the tongue is swollen and coated and the teeth become loosened. In more pronounced cases there may be ulceration of the mucous membrane of the mouth, with gangrene of the soft parts, and necrosis of the jaw in exceptional cases. Besides these local symptoms there may be a loss of appetite, abdominal pains, diarrhœa and disturbed nutrition. These symptoms are sometimes followed by anæmia, neuralgic pains, tremors, paralysis, and even death.

*Treatment.*—The first appearance of mercurialism should be a signal for the discontinuance of the drug causing it. Cleanliness of the mouth may delay or prevent many of the unpleasant symptoms, such as stomatitis, salivation, etc., that might otherwise present themselves during a course of mercurial treatment. Elimination of the mercury already stored in the system should be hastened by the use of potassium iodide, diuretics, etc. With this increased elimination there may be a temporary exaggeration of the symptoms already present.

Further treatment should be symptomatic.

## PREPARATIONS.

Massa Hydrargyri . . . . .	0.06-0.95 Gm.—gr. i-xv.
Hydrargyrum cum Creta . . . . .	0.06-0.95 Gm.—gr i-xv.
Unguentum Hydrargyri . . . . .	For external use.
Emplastrum Hydrargyri . . . . .	For external use.
Emplastrum Ammoniaci cum Hydrargyro .	For external use.
Hydrargyri Chloridum Mite . . . . .	0.005-0.95 Gm.—gr. $\frac{1}{12}$ -xv.
Pilulæ Antimonii Compositæ . . . . .	See Antimony.
Pilulæ Catharticæ Compositæ . . . . .	See Colocynth.
Hydrargyri Iodidum Flavum . . . . .	0.01-0.06 Gm.—gr. $\frac{1}{6}$ -1.
Hydrargyri Oxidum Flavum . . . . .	For external use.
Unguentum Hydrargyri Oxidi Flavi . .	For external use.
Oleatum Hydrargyri . . . . .	For external use.
Hydrargyri Oxidum Rubrum . . . . .	For external use.
Unguentum Hydrargyri Oxidi Rubri . .	For external use.
Hydrargyri Chloridum Corrosivum . . . .	0.001-0.005 Gm.—gr. $\frac{1}{80}$ - $\frac{1}{2}$ .
Hydrargyri Iodidum Rubrum . . . . .	0.003-0.01 Gm.—gr. $\frac{1}{20}$ - $\frac{1}{8}$ .
Hydrargyri Cyanidum . . . . .	0.003-0.01 Gm.—gr. $\frac{1}{20}$ - $\frac{1}{8}$ .
ϕ Hydrargyri Nitræs.	
Liquor Hydrargyri Nitratis . . . . .	For external use.
Unguentum Hydrargyri Nitratis . . . .	For external use.
Hydrargyri Subsulphas Flavus . . . . .	0.01-0.03 Gm.—gr. $\frac{1}{6}$ - $\frac{1}{2}$ .
Hydrargyrum Ammoniatum . . . . .	For external use.
Unguentum Hydrargyri Ammoniaci . . . .	For external use.

## MASSA HYDRARGYRI.

**Mass of Mercury.** Blue Mass. Blue Pill.

A blue mass in which the globules of mercury are not visible because of the minute division produced by trituration. It contains  $33\frac{1}{3}$  per cent. of metallic mercury.

## ACTION.

A single large dose of the mass produces a laxative effect. Small repeated doses give the specific action of mercury. See p. 90.

## USE.

It may be used as a laxative, but calomel is generally to be preferred for this action. It may be used to produce the systemic effects of mercury, but other preparations are generally preferred for this action.

## HYDRARGYRUM CUM CRETA.

**Mercury with Chalk.** Gray Powder.

A gray powder in which the globules of mercury are not visible because

of the minute division produced by trituration. It is composed of mercury 38 Gm., clarified honey 10 Gm., and prepared chalk 57 Gm.

#### ACTION.

Gray powder is quite similar in action to the mass, but weaker. Its laxative properties are less marked, partly on account of the chalk present, which has a slight astringent action. Because of its mildness it is especially convenient where a general mercurial action is wanted for a long time. It has some antiseptic action throughout the intestinal canal.

#### USE.

It may be used as a laxative, mild astringent and antiseptic in the acute stage of infantile diarrhœa characterized by clay-colored stools with an offensive odor. It is considered by some an excellent remedy in the treatment of acute tonsillitis. In syphilis this is a satisfactory mercurial, because it is not apt to cause gastric disturbance.

#### UNGUENTUM HYDRARGYRI.

**Mercurial Ointment.** Blue Ointment.

This is an ointment in which the globules of mercury are not visible because of the minute division produced by trituration. It contains 50 per cent. of metallic mercury and 2 per cent. of oleate of mercury, with lard and suet.

#### ACTION.

By absorption of the mercury from this ointment, the specific effect of the metal is secured. See p. 90.

#### USE.

This ointment is the most satisfactory of the mercurial preparations for local use. For inunction in the treatment of syphilis, 1.90 to 3.75 Gm. ( $3\frac{1}{2}$  to 1) may be used daily. In sub-acute or chronic articular inflammations, equal parts of the mercurial and belladonna ointments may be used by inunction, thus securing the absorbent properties of the mercury, and the sedative effect of the belladonna.

#### EMPLASTRUM HYDRARGYRI.

**Mercurial Plaster.**

This is prepared from mercury, 300 Gm., oleate of mercury, 12 Gm., and lead plaster to make 1000 Gm.

#### ACTION.

The drug action of this plaster is quite similar to, but less pronounced than that of the mercurial ointment. At the same time it acts as a mild counter-irritant, and also gives mechanical support.

## USE.

This plaster is not in general use now, but it may be applied over syphilitic indurations.

**EMPLASTRUM AMMONIACI CUM HYDRARGYRI.****Ammoniac Plaster with Mercury.**

Prepared by combining ammoniac, mercury, oleate of mercury, diluted acetic acid, and lead plaster in proper proportions.

## ACTION.

This plaster combines the alterative properties of ammoniac and mercury.

## USE.

Practically not in use now.

**HYDRARGYRI CHLORIDUM MITE.**  $\text{Hg}_2\text{Cl}_2$ .**Mild Mercurous Chloride.** Calomel.

It should be kept in dark amber-colored bottles.

A white, impalpable powder; permanent in the air; odorless and tasteless. Insoluble in water, alcohol, or ether. It is very heavy, and can be distinguished by its weight from almost every other white powder.

It may be prepared by rubbing mercury with mercuric sulphate, moistened with water, until globules are no longer visible, adding sodium chloride, mixing the whole by trituration, and subliming the mixture into a large chamber.

## ACTION.

Calomel acts, locally, as a bland protectant and mild antiseptic when applied to a denuded surface. Internally, in continued doses, it will produce the specific action of mercury. A single large dose, or frequently repeated small doses, will produce catharsis, and a mild antiseptic action throughout the intestinal canal. Repeated large doses will produce marked diuresis under certain conditions. This diuretic action is supposed to be due to an increase in the amount of urea present as the result of increased metabolism.

## USE.

Calomel may be used as a dusting powder or ointment (1 to 5 per cent.) upon an ulcerated surface, specific or non-specific, for its protectant, stimulant, and antiseptic action.

1.25 to 1.90 Gm. (gr. 20 to 30), used by fumigation, is an excellent but inconvenient method for securing the specific action of mercury in syphilis.

Internally, small doses (0.003 to 0.006 Gm.—gr.  $\frac{1}{20}$  to  $\frac{1}{10}$ ) may be sometimes used to prevent nausea or vomiting. As a cathartic it may be



given in a single dose of 0.30 to 0.60 Gm. (gr. 5 to 10), or in small doses (0.01 to 0.03 Gm.—gr.  $\frac{1}{6}$  to  $\frac{1}{2}$ ) every half hour until the desired effect is secured. In so-called biliousness, when there is constipation attended by light clay-colored stools, calomel is an excellent remedy. For unhealthy children who are constantly troubled with flatulence, foetid breath, and foul-smelling, pasty stools, calomel in 0.01 Gm. (gr.  $\frac{1}{6}$ ) doses, for three or four successive nights, will often be of marked benefit. In cardiac and renal diseases calomel may be used for its diuretic action.

As an anti-syphilitic, for internal administration, calomel is inferior to many other preparations of mercury. It may, however, be conveniently used with children.

#### HYDRARGYRI CHLORIDUM CORROSIVUM. $\text{HgCl}_2$ .

**Corrosive Mercuric Chloride.** Corrosive Sublimate. Mercuric Chloride. Bichloride, or Perchloride of Mercury.

It occurs in heavy, colorless, rhombic crystals, or in crystalline masses; permanent in the air; odorless, having an acrid and persistent metallic taste, and an acid reaction. Soluble, at 15° C., in 16 parts of water, and in 3 parts of alcohol.

It may be prepared by subliming a mixture of yellow mercuric subsulphate with sodium chloride.

#### ACTION.

Corrosive sublimate is irritant and caustic in concentrated form; a useful antiseptic and parasiticide when properly diluted. The addition of tartaric, citric, or hydrochloric acid to the solution increases its antiseptic action by preventing the formation of an insoluble albuminate of mercury. A single overdose, or long-continued medicinal doses, may cause symptoms of irritant poisoning throughout the intestinal canal. Small repeated doses will produce an antiseptic action along the lines of elimination; they will also produce the specific action of mercury.

#### USE.

Corrosive sublimate holds an important place as an antiseptic, when used in solutions varying in strength from 1 in 20,000 to 1 in 1,000. It is used in general surgery, but its irritating and toxic properties must always be borne in mind. As serous membranes absorb very readily, it should not be used in the pleural or abdominal cavity. Because of its destructive action on metal, it is not suitable for disinfecting instruments.

As a parasiticide, strong solutions (1 in 500 to 1 in 300) are used over the affected part.

To bring the patient rapidly under the specific influence of mercury, 0.01 Gm. (gr.  $\frac{1}{6}$ ) may be used daily, hypodermatically.

Internally, small repeated doses are used in the treatment of diphtheria. Also in the treatment of certain forms of summer diarrhœa, characterized by offensive-smelling, greenish stools, or stools containing mucus and blood. It is not a good mercurial for administration by the mouth, to secure the specific action of the metal.

#### TOXICOLOGY.

The symptoms of poisoning from corrosive sublimate are those produced by an irritant poison:—burning pains in the mouth and throat, vomiting, purging with bloody stools, tenesmus, dysurea, collapse, and death. The constitutional effects of mercurialism may appear if the patient survive two or three days.

*Treatment.*—Encourage emesis; give egg albumin freely, both for its protective action and for its property of forming an insoluble albuminate of mercury. Milk may also be used.

#### HYDRARGYRI CYANIDUM. $\text{Hg}(\text{CN})_2$ .

##### Mercuric Cyanide.

It should be kept in well-stoppered, dark amber-colored bottles.

It occurs as colorless, or white, prismatic crystals, becoming dark colored on exposure to the light, odorless, having a bitter metallic taste, and a neutral reaction. Soluble, at  $15^\circ \text{C}$ ., in 12.8 parts of water, and in 15 parts of alcohol.

On adding hydrochloric acid to the aqueous solution, hydrocyanic acid vapor is evolved.

#### ACTION.

Mercuric cyanide is supposed to act after the manner of corrosive sublimate. It is, however, less toxic.

#### USE.

It may be used for the same purposes and by the same methods as corrosive sublimate.

#### HYDRARGYRI IODIDUM FLAVUM. $\text{Hg}_2\text{I}_2$ .

##### Yellow Mercurous Iodide. Protoiodide of Mercury.

It should be kept in well-stoppered bottles, protected from light.

A bright yellow, amorphous powder. It becomes darker by exposure to light, in proportion as it undergoes decomposition into metallic mercury and mercuric iodide; odorless and tasteless. Almost insoluble in water; insoluble in alcohol or ether.

Prepared from mercury, by the action of nitric acid and potassium iodide.

## ACTION.

The yellow mercurous iodide gives the specific action of mercury, with but little disturbance of the alimentary canal, even when continued for a long time.

## USE.

This is a favorite mercurial for internal administration, when the specific action of mercury is wanted, as in syphilis.

**HYDRARGYRI IODIDUM RUBRUM.**  $\text{HgI}_2$ .**Red Mercuric Iodide.** Biniodide of Mercury.

It should be kept in well-stoppered bottles, protected from light.

It occurs as a scarlet-red, amorphous powder, permanent in the air; odorless and tasteless. Almost insoluble in water; soluble in 130 parts of alcohol at  $15^\circ \text{C}$ .; also soluble in a solution of potassium iodide, or of corrosive mercuric chloride.

It may be prepared by mixing solutions of potassium iodide and corrosive sublimate in proper proportions.

## ACTION.

This preparation has an action resembling that of corrosive sublimate.

## USE.

Red mercuric iodide may be used as an antiseptic instead of corrosive sublimate, but it is more expensive, and less convenient because less soluble.

In the treatment of bronchocele, glandular enlargements, syphilitic ulcers, etc., it may be used as an ointment (3 to 5 per cent.).

Internally, it may be given in the treatment of secondary and tertiary syphilis, but it is inferior to the yellow iodide for such use.

 $\Phi$  **HYDRARGYRUM TANNICUM OXYDULATUM.****Mercurous Tannate.**

It should be kept in well-stoppered bottles, protected from the light.

This is a green powder; insoluble, tasteless, and odorless. It is readily decomposed by weak alkalis yielding metallic mercury in very fine subdivision. When treated with alcohol or water, it gives up tannin.

Prepared by adding an excess of sodium tannate to a solution of mercurous nitrate; a yellow precipitate, which soon turns green, is formed.

## ACTION.

Mercurous tannate is not apt to salivate or cause disturbance of the stomach or bowels. It will produce the specific action of mercury promptly.

## USE.

This is one of the best mercurials, for internal administration, in the treatment of syphilis.

Φ **HYDRARGYRI SALICYLAS.**  $\text{HgC}_7\text{H}_4\text{O}_3$ .

**Secondary Mercuric Salicylate.**

It should be kept in well-stoppered bottles, protected from light.

A fine, white, amorphous powder; odorless and tasteless. Insoluble in water and alcohol, but soluble in an alkaline solution.

It may be obtained through the interaction of mercuric sulphate and barium salicylate.

## ACTION.

It will produce the specific action of mercury promptly and without causing the general disturbance so often seen after the use of other mercurials.

## USE.

Internally it may be used in the treatment of syphilis.

**HYDRARGYRI OXIDUM FLAVUM.**  $\text{HgO}$ .

**Yellow Mercuric Oxide. Yellow Precipitate.**

A light orange-yellow, amorphous, heavy, impalpable powder, permanent in the air, but turning darker on exposure to light; odorless and tasteless. Almost insoluble in water; insoluble in alcohol, but readily and completely soluble in diluted nitric or hydrochloric acid, forming colorless solutions.

It may be prepared from corrosive sublimate and a solution of soda, by precipitation.

## ACTION.

That of mercury.

## USE.

Externally in the treatment of indolent ulcers, syphilitic or non-syphilitic.

**HYDRARGYRI OXIDUM RUBRUM.**  $\text{HgO}$ .

**Red Mercuric Oxide. Red Precipitate.**

It should be kept in well-stoppered bottles, protected from light.

It occurs as heavy, orange-red, crystalline scales; or as a crystalline powder, becoming more yellow the finer it is divided; permanent in the air; odorless, and having a somewhat metallic taste. Insoluble in water or alcohol, but soluble readily and completely in diluted nitric, or hydrochloric, acid.

It may be prepared by triturating mercuric nitrate and metallic mercury together and applying heat until nitrous fumes cease to be given off.

#### ACTION.

Beside having the specific action of mercury, the red oxide acts as a local mechanical irritant, because of its crystalline form.

#### USE.

Quite limited. It has no advantages and many disadvantages, as compared with many other mercurials, for internal use. The yellow oxide is generally preferred to the red oxide as a local application.

#### HYDRARGYRUM AMMONIATUM. $\text{NH}_2\text{HgCl}$ .

**Mercuric Ammonium Chloride.** White Precipitate.

It must be kept in well-stoppered bottles, protected from light.

It occurs as white, pulverulent pieces, or as a white, amorphous powder; permanent in the air; odorless, with an earthy, afterwards styptic, metallic taste. Almost insoluble in water or in alcohol. Readily soluble in warm hydrochloric, nitric, or acetic acids, or in a solution of ammonium carbonate.

It may be obtained by precipitation, from an aqueous solution of corrosive sublimate, and water of ammonia.

#### ACTION.

Locally, the ammoniated mercury is stimulating and irritant in action. It acts also as a parasiticide. If absorbed, it produces the specific action of mercury.

#### USE.

A 1 to 5 per cent. ointment may be used in the treatment of scabies, tinea, to destroy pediculi, etc. It may also be used in the local treatment of certain forms of skin disease. The official ointment (10 per cent.) is too strong for use undiluted.

#### Φ **HYDRARGYRI NITRAS.** $\text{Hg}(\text{NO}_3)_2$ .

**Mercuric Nitrate.**

This is used in the form of the official preparations.

Liquor Hydrargyri Nitratis.

Unguentum Hydrargyri Nitratis.

**Liquor Hydrargyri Nitratis.** Solution of Mercuric Nitrate.

It should be kept in glass-stoppered bottles.

This is a clear, nearly colorless liquid, having a faint odor of nitric acid and a strongly acid reaction.



Obtained from red mercuric oxide 40 Gm., nitric acid 45 Gm., water 15 Gm. It contains about 60 per cent. of mercuric nitrate together with about 11 per cent. of free nitric acid.

**Uguentum Hydrargyri Nitratis** (Citrine Ointment). This ointment has a fine, lemon-yellow color. It is prepared from mercury 70 Gm., nitric acid 175 Gm., lard oil 760 Gm.

#### ACTION.

The nitrate in the form of the official *liquor* is an exceedingly active, penetrating, and painful caustic. The official *ointment* has a stimulating, irritating action. Absorbed it will produce the specific action of mercury.

#### USE.

The liquor may be used for its caustic action upon syphilitic ulcers. The ointment may be used in the treatment of chronic skin diseases.

**HYDRARGYRI SUBSULPHAS FLAVUS.**  $\text{Hg}(\text{HgO})_2\text{SO}_4$ .

**Yellow Mercuric Subsulphate.** Turpeth Mineral.

It must be kept in well-stoppered bottles, protected from light.

A heavy, lemon-yellow powder; permanent in the air; odorless, and almost tasteless. Soluble in about 2000 parts of water; insoluble in alcohol; soluble in nitric or hydrochloric acid.

This salt may be prepared by subjecting the red mercuric sulphide to the action of boiling distilled water in abundance. Decomposition takes place; an acid sulphate, which dissolves in the water, and a basic sulphate, which falls as an insoluble yellow precipitate, are formed.

#### ACTION.

This is a prompt and non-depressing emetic—an irritating emetic. If emesis does not occur, then absorption takes place, and is followed by the specific action of mercury. Large doses act as a corrosive poison.

#### USE.

It may be used as a non-depressing emetic in membranous croup, diphtheria, etc., with no advantage over other non-depressing emetics.

#### PHOSPHORUS. P.

A non-metallic element. A translucent, nearly colorless solid, of a waxy lustre, having at the ordinary temperature about the consistence of beeswax. It has a distinctive and disagreeable odor and taste, but should not be tasted except in a state of great dilution. It is insoluble or nearly so in water, to which, however, it imparts its characteristic, disagreeable odor and taste. Soluble in 350 parts of absolute alcohol at 15° C., and in 80 parts of absolute ether; in about 50 parts of any fatty oil; very

soluble in chloroform. When exposed to the air, it emits white fumes which are luminous in the dark and have an odor somewhat resembling that of garlic. On longer exposure to air it takes fire spontaneously. Sp. gr.: 1.830 at 10° C. (50° F.) It melts at 44° C. (111.2° F.) It should be kept under water, in a secure and moderately cool place, protected from light.

*Source.*—Obtained from bones.

*General Action of Phosphorus.*—Living protoplasm has the power of oxidizing phosphorus, and also of reducing the products of its oxidation. It enters the circulation unchanged and is excreted by the kidneys unchanged, or as phosphoric acid.

It quickens metabolism. In small doses it appears to cause development of fibrous tissue in the liver, and in doses too small to affect the liver, it acts upon osseous tissue, causing bones to become denser. This action is due to stimulation of tissue growth.

Large doses cause the characteristic symptoms of phosphorus poisoning.

The action of compounds containing phosphorus appears to depend largely on the degree of saturation of its affinities, and the readiness with which phosphorus may attach itself to the organic constituents of the tissues. Thus phosphoric acid, in which the affinities of the phosphorus are fully saturated by oxygen, appears to act simply as an acid without exerting any specific action. Phosphorus, besides stimulating bone production, is a direct food to nervous tissue.

#### TOXICOLOGY.

Phosphorus acts as an irritant poison, causing a burning sensation in the throat and stomach, thirst, nausea, and vomiting. The vomitus, also the stools and the urine, may be luminous for a few hours after the ingestion of the poison. There is a peculiar garlic-like odor and taste present. After absorption takes place a new set of symptoms appear: The patient may have been apparently convalescing up to the third or fourth day. Then may follow jaundice, enlargement of the liver, increased abdominal pain, vomiting; the pulse becomes first rapid, then weak and slow; there is a hemorrhagic tendency—bleeding from the mouth, nose, stomach, intestines, uterus, extravasations beneath the skin and mucous membranes, etc.; the urine is diminished in quantity, albuminous, and often of a dark brown or green color, due to the presence of bile.

Post-mortem examination shows marked fatty degenerations.

*Treatment*—Empty and cleanse the stomach as soon as possible, after the ingestion of the poison, by means of the syphon tube, or emetics. Copper sulphate—0.12 to 0.24 Gm. (2 to 4 gr.) every five or ten minutes until emesis occurs—is one of the best emetics, for the soluble salts of copper form with phosphorus an insoluble phosphide. Mucilaginous and

albuminous drinks and foods may be given ; but *fats and oils must be avoided* during the whole progress of the case because phosphorus is soluble in these, and its toxic action is increased.

#### PREPARATIONS.

Phosphorus . . . . .	0.0006-0.0008	Gm. gr. $\frac{1}{100}$ - $\frac{1}{75}$ .
Oleum Phosphoratum (1%) . . . . .	0.06-0.18	Cc. ℥ i-iiij.
Pilulæ Phosphori . . . . .	One pill.=0.0006	Gm. gr. $\frac{1}{100}$ .
Spiritus Phosphori . . . . .	0.30-0.60	Cc. ℥ v-x.
Elixir Phosphori . . . . .	0.60-1.90	Cc. ℥ x-xxx.
Zinci Phosphidum . . . . .	0.0012-0.005	Gm. gr. $\frac{1}{80}$ - $\frac{1}{12}$ .

#### **Oleum Phosphoratum.** Phosphorated Oil.

A clear, yellowish liquid, having the odor of phosphorus and of ether, but not phosphorescent in the dark. It should be perfectly free from any particles of undissolved phosphorus.

Prepared by dissolving phosphorus in almond oil and ether, and contains 1 per cent. of phosphorus. It should be kept in small glass-stoppered vials, completely filled, and in a cool, dark place.

#### **Spiritus Phosphori.** Spirit of Phosphorus. Tincture of Phosphorus.

Prepared by dissolving 1.2 Gm. of phosphorus in 1000 Cc. of absolute alcohol.

It must be kept in dark, amber-colored vials, securely stoppered, and in a dark, cool place.

#### **Elixir Phosphori.** Elixir of Phosphorus.

It is composed of spirit of phosphorus, glycerin, aromatic elixir, and oil of anise. Each Cc. contains about 0.00025 of phosphorus.

#### USE.

Phosphorus and its preparations are used in the treatment of rachitis, osteomalacia, and sometimes in ununited fractures, because of its influence on the development of bone. Phosphorus has been recommended in the treatment of various forms of nervous exhaustion, but it is of questionable value, and may even do harm by producing fatty degeneration of internal organs.

#### **ZINCI PHOSPHIDUM.** $Zn_3P_2$ .

#### **Zinc Phosphide.**

It should be kept in small, glass-stoppered vials.

It occurs as a gritty powder of a dark-gray color, or as crystalline fragments of a dark metallic lustre, and having a faint odor and taste of phosphorus. In contact with air it slowly emits phosphorus vapor. Insoluble in water or alcohol. Soluble in diluted hydrochloric or sulphuric acid

with evolution of hydrogen phosphide. When heated in air, it becomes oxidized to zinc phosphate.

It may be prepared by passing phosphorous vapors in a current of dry hydrogen over fused zinc.

#### ACTION.

Zinc phosphide has the general action of phosphorus, but being less of an irritant it is not so apt to disturb digestion. At the same time it is not so reliable as phosphorus.

#### USE.

The same as that of phosphorus.

### THE HYPOPHOSPHITES.

These are salts obtained by the union of hypophosphorous acid with a salifiable base.

#### ACTION.

The hypophosphites are supposed to have the general action of phosphorus. If such action exists it is to a very limited degree. Their therapeutic value depends largely upon the basic radicle. They are convenient preparations for the administration of calcium or other substances.

#### USE.

The hypophosphites are simply convenient vehicles for administering calcium, iron, etc., as reconstructants in the treatment of wasting diseases, such as phthisis.

#### PREPARATIONS.

Calcii Hypophosphis, . . . . .	0.30-0.95 Gm.	gr. v-xv.
Ferri Hypophosphis . . . . .	0.30-0.95 Gm.	gr. v-xv.
Potassii Hypophosphis . . . . .	0.30-0.95 Gm.	gr. v-xv.
Sodii Hypophosphis . . . . .	0.30-0.95 Gm.	gr. v-xv.
Syrupus Hypophosphitum . . . . .	3.75-7.50 Cc.	ʒj-ij.
Syrupus Hypophosphitum cum Ferro, . . . . .	3.75-7.50 Cc.	ʒj-ij.

#### CALCII HYPOPHOSPHIS. $\text{Ca}(\text{PH}_2\text{O}_2)_2$ .

#### Calcium Hypophosphite.

It occurs as colorless, transparent prisms, or as small, lustrous scales, or as a white, crystalline powder; odorless, having a nauseous, bitter taste, and neutral reaction; permanent in the air. Soluble in 6.8 parts of water at  $15^\circ \text{C}$ .; insoluble in alcohol.

Prepared from slaked lime and phosphorus.

#### FERRI HYPOPHOSPHIS. $\text{Fe}_2(\text{PH}_2\text{O}_2)_6$ .

#### Ferric Hypophosphite.

It should be kept in well-stoppered bottles.

It occurs as a white or grayish white powder; odorless, and nearly

tasteless; permanent in the air. Only slightly soluble in water; more readily soluble in the presence of hypophosphorous acid.

It may be prepared by the action of hypophosphorous acid on ferrous carbonate.

#### **POTASSII HYPOPHOSPHIS. $KPH_2O_2$ .**

##### **Potassium Hypophosphite.**

It should be kept in well-stoppered bottles.

It occurs as white, opaque plates, or as crystalline masses, or as a granular powder; odorless, and having a pungent, saline taste. Very deliquescent. Soluble, at  $15^\circ C.$ , in 0.6 part of water, and in 7.3 parts of alcohol.

Prepared by mixing solutions of calcium hypophosphite and granulated potassium carbonate.

#### **SODII HYPOPHOSPHIS. $NaPH_2O_2$ .**

##### **Sodium Hypophosphite.**

It should be kept in well-stoppered bottles.

It occurs in small, colorless, transparent plates of a pearly lustre, or as a white, granular powder; odorless, and having a bitterish-sweet, saline taste. Very deliquescent on exposure to moist air. Soluble, at  $15^\circ C.$ , in 1 part of water, and in 30 parts of alcohol.

Prepared by mixing solutions of calcium hypophosphite and crystallized sodium carbonate.

#### **SYRUPUS HYPOPHOSPHITUM.**

##### **Syrup of Hypophosphites.**

This is a simple solution of the hypophosphites of lime, potassium, and sodium in water, aided by diluted hypophosphorous acid; protected by sugar, and flavored with spirit of lemon.

#### **SYRUPUS HYPOPHOSPHITUM CUM FERRO.**

##### **Syrup of Hypophosphites with Iron.**

This is the syrup of hypophosphites plus ferrous lactate, 10 Gm. in 1000. It should be freshly made as wanted, owing to the liability to change of the ferrous lactate.

#### **THE LACTOPHOSPHATES.**

These are phosphates combined with lactic acid.

#### **ACTION.**

The lactophosphates have the general action of, but are generally conceded to be superior to, the hypophosphites.



## USE.

The lactophosphates are used after the manner of the hypophosphites in the treatment of wasting diseases.

## PREPARATIONS.

Syrupus Calcii Lactophosphites . . . . . 3.75-7.50 Cc. ʒi-ij.

## ARSENUM. As.

A metal, steel-colored, crystalline, brittle, very volatile; when heated it gives off garlicky fumes. It forms two classes of salts, the arsenites and arsenates.

*Source*.—Arsenic occurs in many ores, combined with metals, oxygen, and sulphur. The metal is not official.

For action, toxicology, etc., see arsenous acid.

## PREPARATIONS.

Acidum Arsenosum (Arsenic) . . . . . 0.001-0.005 Gm. gr.  $\frac{1}{80}$ - $\frac{1}{12}$ .

Liquor Acidi Arsenosi . . . . . 0.12-0.30 Cc. ℥ ij-v.

Liquor Potassii Arsenitis . . . . . 0.12-0.30 Cc. ℥ ij-v.

Arseni Iodidum . . . . . 0.001-0.005 Gm. gr.  $\frac{1}{80}$ - $\frac{1}{12}$ .

Liquor Arseni et Hydrargyri Iodidi 0.12-0.30 Cc. ℥ ij-v.

Sodii Arsenas . . . . . 0.005-0.02 Gm. gr.  $\frac{1}{12}$ - $\frac{1}{3}$ .

Liquor Sodii Arsenatis . . . . . 0.12-0.30 Cc. ℥ ij-v.

Cupri Arsenitis . . . . . 0.00006 Gm. gr.  $\frac{1}{1000}$ .

ACIDUM ARSENUM. As<sub>2</sub>O<sub>3</sub>.

**Arsenous Acid.** Arsenic Trioxide. White arsenic.

This is an anhydride (not a true acid except in aqueous solution).

It is a heavy solid, occurring either as an opaque, white powder, or in irregular masses of two varieties; the one amorphous, transparent, and colorless, like glass; the other crystalline, opaque or white, resembling porcelain. Both varieties are odorless and tasteless. Both varieties dissolve slowly, at 15° C., in water, or alcohol; soluble in 5 parts of glycerin.

Obtained by roasting arsenical ores, and purifying by sublimation.

**Liquor Acidi Arsenosi.** Solution of arsenous acid.

A clear, colorless liquid, odorless, having an acidulous taste and an acid reaction. It is a 1 per cent. solution.

**Liquor Potassii Arsenitis.** Solution of Potassium Arsenite (Fowler's solution).

A clear, almost colorless liquid, with an alkaline reaction, and having the odor and taste of lavender. The potassium arsenite is obtained by the reaction between arsenous acid and potassium bicarbonate.

This is a 1 per cent. solution.

## ACTION.

Arsenous acid has an irritant, caustic, and antiseptic action. It has no great affinity for albumin and does not coagulate it. Its general action is due to chemical changes which follow its coming in contact with alkaline compounds in the tissues and fluids of the body. The chemical changes take place at the expense of the tissues to which the arsenous acid has been applied. As a rule these changes are more rapid in pathological tissues than in normal tissues, because of the greater proportion of water, carbonates, and phosphates present, and, again, because pathological structures are of lower vitality than normal tissues. These two facts explain the selective action of arsenous acid when applied locally to pathological structures. Furthermore, the irritation produced by the drug causes a greater supply of blood to the part, and the sound tissue which is able to utilize this increased amount of nutritive material takes on a rapid reparative action around the diseased zone.

Internally, small doses act upon the mucous membrane of the stomach, stimulating the nerves and vessels, causing a sense of warmth and hunger, and increasing gastric function. By its antiseptic action it may also prevent fermentation. Larger doses may cause inflammation of the alimentary canal, resulting in nausea, vomiting, diarrhoea and pain. Still larger doses act as an irritant poison. During the passage of arsenous acid through the organs and tissues, metabolism is distinctly influenced. Small doses increase the vital activity, and the drug acts as a general tonic. Taken for a long time, it may cause fatty degeneration of the various tissues with which it comes in contact. Arsenic may also affect the life of other living particles in the body besides the tissue elements, namely, the organisms of certain diseases; it is thus an antiperiodic, next in value to quinine. Its action on the nervous system is to diminish the sensibility and reflex irritability of the centres. Larger doses paralyze both the sensory and motor nerves. Small doses increase, large doses diminish the pulse rate and lower blood pressure. Small doses act as a stimulant to the respiratory centre, large (toxic) doses act as a respiratory depressant.

Arsenic is eliminated by the liver, kidneys, skin, lungs, and probably by all the secretions.

## USE.

In prescribing arsenic the following facts should be kept in mind:

1. Children will bear larger doses, relatively, than will adults.
2. A tolerance for the drug may be established.
3. Small doses of arsenic, when indicated, are generally given before meals.

4. Larger doses, when indicated, should be given after meals.

Locally, arsenous acid, in the form of a paste, has been used as an

escharotic in the treatment of cancer, etc., but its application is painful and dangerous.

Internally, arsenous acid, or Fowler's solution, is used for its stimulating action; such action being apparent throughout the alimentary canal, and along the lines of elimination.

When the constitutional action of arsenic is wanted the drug may be administered hypodermatically. Larger doses can thus be tolerated. 0.18 Cc. (℥. 3) of a 5 per cent. solution of arsenous acid may be used as an initial dose, and this quantity may be gradually increased every second day up to 0.60 Cc. (℥. 10) or more. This method of medication is painful and not adapted for use with children.

#### TOXICOLOGY.

Arsenous acid is an irritant poison. The symptoms produced are nausea; an intense burning pain in the throat, œsophagus, and stomach, followed by violent and incessant vomiting; purging and tenesmus may also be present. The vomitus and the stools may contain blood. The pain extends over the whole abdomen. The urine may be bloody, scanty, or suppressed. There is great thirst, with dryness of the mouth and throat. The pulse becomes rapid, weak, and intermittent. The skin is cold and covered with perspiration. Muscular cramps occur. Collapse and death may follow.

Sometimes the individual passes quickly into a state of collapse, followed by death, without any marked symptoms of irritation having been present.

*Treatment.*—Empty the stomach as quickly as possible by means of the syphon tube, or by the judicious use of emetics. Of chemical antidotes, hydrated oxide of iron alone, or combined with magnesia, or the dialyzed iron, are among the best. The after-treatment should be symptomatic.

*Chronic arsenical poisoning*, which may occur from the continued medicinal use of the drug, or from the absorption of arsenic detached from wall-paper, clothing, etc., causes irritation of the nasal mucous membrane, of the conjunctivæ, etc., giving rise to a train of symptoms resembling those of acute coryza. There may also occur loss of appetite, nausea and sometimes diarrhœa.

*Treatment.*—Remove the cause.

#### ARSENI IODIDUM. $\text{AsI}_3$ .

##### Arsenic Iodide.

It should be kept in glass-stoppered vials, in a cool place, protected from light.

It occurs as glossy, orange-red, crystalline masses, or as shining,

orange-red, crystalline scales, having an iodine-like odor and taste, and gradually losing iodine on exposure to air and light. Soluble, at  $15^{\circ}$  C., in 7 parts of water, and in about 30 parts of alcohol.

Prepared by direct combination of iodine and metallic arsenic, or by evaporating to dryness an aqueous solution of arsenous and hydriodic acids.

**Liquor Arseni et Hydrargyri Iodidi.** Solution of Arsenic and Mercuric Iodide (Donovan's Solution).

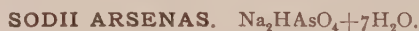
A pale, yellow liquid, with a metallic taste. It contains 1 per cent. each of arsenic iodide and red mercuric iodide.

#### ACTION.

Arsenic iodide has practically the action of arsenous acid. Its action is supposed to be influenced by the iodine present.

#### USE.

The same as that for arsenous acid.



#### Sodium Arsenate.

It should be kept in well-stoppered bottles.

It occurs as colorless, transparent prisms; odorless, and having a mild, alkaline taste. Efflorescent in dry air and somewhat deliquescent in moist air. Soluble in 4 parts of water at  $15^{\circ}$  C.; sparingly soluble in alcohol.

Prepared by fusing arsenous acid with sodium nitrate and carbonate.

**Liquor Sodii Arsenatis.**—Solution of sodium arsenate. This is a 1 per cent. solution of sodium arsenate. A clear, colorless liquid.

#### ACTION.

Sodium arsenate has practically the action of arsenous acid. It is supposed to be less of a gastric irritant than the arsenous acid, or the potassium arsenite.

#### USE.

The same as that for arsenous acid.



#### Copper Arsenite. Scheele's Green.

This occurs as a light-green powder; odorless and tasteless. Sparingly soluble in water, or alcohol.

Prepared by adding sodium arsenite to a solution of copper sulphate.

## ACTION.

Quite similar to that of arsenous acid. It is supposed to be of special value in the treatment of certain intestinal diseases, because of the energetic stimulation produced upon the intestinal mucous membrane, thus increasing its power to resist invasion from pathogenic micro-organisms, and at the same time favoring a normal condition of the circulation. There may also exist a mild antiseptic action.

## USE.

In acute diarrhœa, dysentery, cholera, typhoid fever, etc., copper arsenite has found marked favor in the hands of some physicians. It is generally used in very minute doses. A  $\frac{6}{100}$  milligramme (gr.  $\frac{1}{100}$ ) is dissolved in 120 Cc. (℥iv) of water, and of this solution a teaspoonful is given every ten minutes for the first hour, then hourly until relief appears. A few doses are said to be sufficient.

## ANTIMONIUM. Sb.

**Antimony.** Stibium.

A metal found chiefly in the form of sulphide. The ore is freed by fusion from earthy impurities. It has a bluish-white color and strong lustre. It is extremely brittle, being reduced to powder with the utmost ease. The metal is not official.

*General Action of Antimony.*—Salts of antimony probably combine with albumin, but they form no precipitate in an alkaline solution—only in an acid solution.

Locally, the soluble antimonials are irritant, causing a pustular eruption resembling that of small-pox.

Internally, small doses of the soluble salts cause a sensation of warmth in the stomach. There is increased secretion of the gastric and intestinal mucous membrane; increased bronchial secretion; increased diuresis and diaphoresis; increased secretion of bile. The pulse-rate is lowered and arterial tension is diminished.

Larger doses cause vomiting, with great depression of the circulation, and relaxation of both voluntary and involuntary muscles.

The emetic action of the drug is direct, due to irritation of the stomach; and indirect, due to a stimulating action on the vomiting centre. The circulation is depressed from the first, the drug reducing the force and frequency of the pulse, both by its action upon the heart, and upon the walls of the blood-vessels.

The nervous system is markedly depressed, in part directly, in part indirectly, through the circulation.

On tissues, the action of antimony closely resembles that of arsenic.

Elimination takes place through the gastric mucous membrane, and



other mucous surfaces ; also, through the liver, kidneys, and skin. The specific local action of the drug may occur along these lines of elimination.

Tartar emetic is practically the only antimonial salt that is used in this country.

#### TOXICOLOGY.

In the event of a poisonous quantity of any one of the soluble antimonial salts having been ingested, symptoms of irritant poisoning, closely resembling those of arsenical poisoning, follow. There is also great prostration.

*Treatment.*—Tannic acid, or some substance containing tannic acid, is administered, in order to form an insoluble tannate. Further treatment is symptomatic.

#### PREPARATIONS.

Antimonii et Potassii Tartras, . .	0.002–0.03	Gm. gr. $\frac{1}{30}$ – $\frac{1}{2}$ .
Vinum Antimonii, . . . .	0.60–3.75	Cc. ℥ <sub>x</sub> –ʒi.
Syrupus Scillæ Compositus. . .	0.60–1.90	Cc. ℥ <sub>x</sub> –xxx.
☿ Antimonii Oxysulphuratum, . .	0.03–0.06	Gm. gr. $\frac{1}{2}$ –i.
Antimonii Oxidum.		Pharm. use.
Pulvis Antimonialis, . . . .	0.06–0.18	Gm. gr. i–iij.
Antimonii Sulphidum.		Pharm. use.
Antimonii Sulphidum Purificatum.		Pharm. use.
Antimonii Sulphuratum, . . . .	0.06–0.12	Gm. gr. i–ij.
Pilulæ Antimonii Compositæ.		

**ANTIMONII ET POTASSII TARTRAS.**  $2K(SbO)C_4H_4O_6 + H_2O$ .

**Antimony and Potassium Tartrate.** Tartar Emetic.

It should be kept in well-stoppered bottles.

It occurs as small transparent crystals, becoming opaque and white on exposure to air ; or as a white granular powder, having a sweet, afterward disagreeable metallic taste, and a feebly acid reaction. Soluble in 17 parts of water at 15° C. ; insoluble in alcohol.

It may be prepared by boiling together antimony oxide and potassium bitartrate.

**Vinum Antimonii.** Wine of Antimony contains 4 parts in 1000 of tartar emetic.

**Syrupus Scillæ Compositus** (see Scilla) contains 2 parts in 1000 of tartar emetic.

#### ACTION AND TOXICOLOGY.

The action, and toxicology of tartar emetic is that of a soluble antimonial salt, already described under antimony. See p. 109.

## USE.

Tartar emetic is seldom used now as an emetic or as a counter-irritant. It is used in small but frequently repeated doses of 0.0006 Gm. (gr.  $\frac{1}{1000}$ .) every hour in the acute stage of certain sthenic inflammatory conditions, notably bronchitis, coryza, etc.—for its depressing, and sedative action upon the heart.

**ANTIMONII OXIDUM.**  $\text{Sb}_2\text{O}_3$ .**Antimony Oxide.**

A heavy, grayish-white powder; permanent in the air; odorless and tasteless; almost insoluble in water, and insoluble in alcohol.

It may be prepared by pouring a solution of antimony chloride into water and treating the precipitate of oxychloride with sodium carbonate.

**Pulvis Antimonialis** (James Powder). Composed of antimony oxide,  $\frac{1}{3}$  part; precipitated calcium phosphate,  $\frac{2}{3}$  part.

## ACTION.

Antimony oxide has the general action of tartar emetic, but to a less marked degree because of its sparing solubility.

## USE.

Practically it has no therapeutic use now.

**ANTIMONII SULPHIDUM.**  $\text{Sb}_2\text{S}_3$ .**Antimony Sulphide.**

It occurs in steel-gray masses, of a metallic lustre, forming a black, or grayish black, lustreless powder; without odor or taste, and permanent in the air. Insoluble in water or alcohol, but soluble in hydrochloric acid with the evolution of hydrogen sulphide.

It is native antimony sulphide, purified from siliceous matter by fusion and as free from arsenic as possible.

**ANTIMONII SULPHIDUM PURIFICATUM.**  $\text{Sb}_2\text{S}_3$ **Purified Antimony Sulphide.** Black Antimony.

It is a heavy, grayish-black, lustreless powder; odorless and tasteless. Insoluble in water or alcohol, but soluble in hydrochloric acid with the evolution of hydrogen sulphide.

It is prepared by reducing antimony sulphide to a very fine powder, and macerating it in ammonia water for five days; then washing the residue, and drying by heat. By this process, impurities in the native sulphide are gotten rid of.

**ACTION.**

Antimony sulphide is practically inert, but when changed into a soluble form of antimony it then has the general action of the soluble salts.

**USE.**

It is not used now.

**ANTIMONIUM SULPHURATUM.****Sulphurated Antimony.** Kermes Mineral.

This consists chiefly of antimony sulphide ( $\text{Sb}_2\text{S}_3$ ) with a very small amount of antimony trioxide ( $\text{SbO}_{23}$ ).

It is a reddish-brown amorphous powder; odorless and tasteless. Insoluble in water and alcohol, but soluble in hydrochloric acid with the evolution of hydrogen sulphide.

Prepared by boiling purified antimony sulphide with a solution of caustic soda and adding diluted sulphuric acid.

**ACTION.**

Sulphurated antimony has the general action of other antimonials.

**USE.**

Practically it is not in use.

**BISMUTHUM. Bi.**

A metal disseminated through various rocks, from which it is separated by simple exposure to heat. It has a reddish-white color. The metal is not official.

*General Action of Bismuth.*—The soluble salts of bismuth when given in large doses have an action like arsenic, or antimony, causing irritation throughout the alimentary canal. Small doses of soluble salts, or large doses of insoluble or sparingly soluble salts have a sedative and astringent action on the part to which it is applied, whether this be a denuded surface, or mucous membrane.

The insoluble preparations, applied in the form of an ointment or powder, have a protectant action.

**PREPARATIONS.**

Bismuthi et Ammonii Citras, . . . . .	0.06–0.18 Gm. gr. i–ij.
Bismuthi Citras, . . . . .	0.06–0.18 Gm. gr. i–ij.
Bismuthi Subcarbonas, . . . . .	0.60–1.90 Gm. gr. x–xxx.
Bismuthi Subnitras, . . . . .	0.60–1.90 Gm. gr. x–xxx.
Bismuthi Subgallas, . . . . .	0.60–1.90 Gm. gr. x–xxx.

**BISMUTHI SUBNITRAS.****Bismuth Subnitrate.**

A heavy, white powder, of somewhat varying chemical composition;

permanent in the air ; odorless, and almost tasteless, showing a slightly acid reaction when moistened. Insoluble in water or in alcohol, but readily soluble in nitric, or hydrochloric acid.

Prepared from bismuth by dissolving it in nitric acid and pouring into water.

#### ACTION.

Bismuth subnitrate has a protectant, sedative, and slightly astringent action, upon mucous membranes, or upon denuded surfaces.

#### USE.

Bismuth subnitrate may be used locally as a protectant dressing, either as a dusting powder, or as an ointment.

Internally it may be used in gastric and intestinal diseases, for its sedative and protectant action.

### BISMUTHI SUBCARBONAS.

#### Bismuth Subcarbonate.

A white, or pale yellowish-white powder, of somewhat varying chemical composition ; odorless and tasteless. Insoluble in water or alcohol, but completely soluble in nitric or hydrochloric acid, with copious effervescence.

Prepared from bismuth by dissolving it in nitric acid, evaporating to a small bulk, and adding the product to a solution of ammonium carbonate.

#### ACTION.

That of the insoluble bismuth salts.

#### USE.

The same as that of bismuth subnitrate for internal administrations. Therapeutically it is inferior to the subnitrate.

### BISMUTHI CITRAS. $\text{BiC}_6\text{H}_5\text{O}_7$ .

#### Bismuth Citrate.

A white, amorphous powder, permanent in the air ; odorless and tasteless. Insoluble in water or alcohol, but soluble in ammonia water.

Prepared by boiling the bismuth subnitrate with citric acid.

#### ACTION.

Bismuth citrate has the action of an insoluble bismuth salt.

#### USE.

It is used pharmaceutically in preparing the bismuth and ammonium citrate. It has no therapeutic use.

### BISMUTHI ET AMMONII CITRAS.

#### Bismuth and Ammonium Citrate.

It should be kept in small, well-stoppered bottles, protected from light.

It occurs as small, shining, pearly or transparent scales, becoming opaque on exposure to air; colorless; having a slightly acidulous and metallic taste, and a neutral, or faintly alkaline reaction. Very soluble in water; sparingly soluble in alcohol.

Prepared from bismuth citrate by treating it with water of ammonia.

#### ACTION.

This soluble salt of bismuth is more stringent than the subnitrate, or the subcarbonate. It is also irritant and may produce the toxic symptoms of an irritant poison. It has none of the protectant properties of the subnitrate.

#### USE.

As an astringent it may be used, well diluted, in chronic diarrhœa. Its therapeutic use is limited.

#### Φ BISMUTHI SUBGALLAS.

##### Bismuth Subgallate. Dermatol.

This drug is a chemical compound of which gallic acid and bismuth oxide are the components.

It is a pale yellow powder; odorless; non-hygroscopic; permanent in the air, even at a temperature of 100° C. Insoluble.

#### ACTION.

Bismuth subgallate has the general action of the insoluble bismuth salts. It is slightly kolyseptic.

#### USE.

It may be used locally as a protectant and astringent dusting powder. Internally it has been found more useful than the subnitrate in gastric and intestinal disturbances, because of its more marked astringent and kolyseptic action.

#### CHROMIUM. Cr.

A metal obtained in the pure state as a light-green crystalline powder. It occurs principally as a chromite—a combination of chromic oxide with ferrous oxide— $\text{Cr}_2\text{O}_3\text{FeO}$ . The metal is not official.

#### PREPARATIONS.

Acidum Chromicum . . . . . For external use.  
Potassii Bichromas . . . . . For external use.

#### POTASSII BICHROMAS. $\text{K}_2\text{Cr}_2\text{O}_7$ .

##### Potassium Bichromate.

It occurs as large, orange-red, transparent, prismatic crystals; permanent in the air; odorless; having a bitter, disagreeable, metallic taste, and an acid reaction. Soluble in 10 parts of water at 15° C.; insoluble in alcohol.



It is prepared from potassium chromate by treating it with sulphuric acid and its salts.

#### ACTION.

Potassium bichromate has an action similar to, but milder than that of chromic acid, *q. v.*

#### USE.

It may be used when a less active escharotic than chromic acid is wanted.

#### ACIDUM CHROMICUM. $\text{CrO}_3$ .

**Chromic Acid.** Chromic Trioxide. Chromic Anhydride.

This is not a true acid (an anhydride).

Chromic acid should be kept in glass-stoppered bottles, and great caution should be observed to avoid bringing it in contact with organic substances, as accidents are liable to result.

It occurs in small, needle-shaped crystals, or in rhombic prisms, of a dark purplish-red color, and metallic lustre; odorless; destructive to animal and vegetable tissues. Deliquescent in moist air; very soluble in water.

It may be prepared from potassium bichromate by the action of sulphuric acid.

#### ACTION.

This acid is astringent, stimulant and caustic. It readily gives off oxygen and thus acts as a deodorant and antiseptic. When used externally, enough may be absorbed to produce toxic symptoms. As a caustic it forms a dry antiseptic eschar, which separates in two or three days, leaving a healthy granulating surface. There is often a marked tendency to contraction of the tissues around the point of application.

#### USE.

Chromic acid is used in the pure state, or diluted to 25 per cent., for its caustic action, in the removal of warts, and other morbid growths; upon unhealthy granulating surfaces; in the treatment of fibrous hypertrophies, and polypoid growths of mucous membranes; to arrest superficial hemorrhages. For its astringent and stimulating action it may be used well diluted (a  $\frac{1}{2}$  to 2 per cent. solution) in the nose and pharynx; upon other mucous membranes; and upon indolent sores.

#### TOXICOLOGY.

Chromic acid acts as an irritant poison, causing pain, vomiting and purging, etc. The pulse is feeble. The urine may be suppressed. Death may be preceded by coma.

*Treatment.*—As chemical antidotes, potassium or sodium carbonate, magnesia, or chalk, may be administered to convert the chromic acid, or bichromate of potash, to a neutral chromate.

**FERRUM. Fe.**

Metallic iron in the form of fine, bright, and non-elastic wire.

*Source.*—Iron is found native in the metallic state; also as an oxide, sulphide, chloride, carbonate, phosphate, sulphate, and arsenate. It is obtained from its ores by smelting with coke, and clay, or limestone.

*General Action of Iron.*—Iron is a normal constituent of the animal body, thus differing from most of the other heavy metals. It forms an important part of the hæmoglobin which acts as an oxygen carrier to the tissues. Tissue oxidation depends more or less upon the amount of iron present in the body. Iron may, therefore, be regarded as a food as well as a medicine. The property of enriching the red blood corpuscles in hæmoglobin is essentially the whole of the so-called constitutional, or hæmatinic, action of iron. Iron compounds, unless debarred by properties of local irritation, may be given with a freedom impossible with most other distinctly metallic salts.

The action of iron is not simply to supply a deficiency of this metal in the hæmoglobin, for it must be given as a medicine in great excess of the actual amount required.—There are two theories at the present time regarding the hæmatinic action of iron. First (old), that the iron salts unite with albumin and form albuminates, which, in some way, pass into the system to give origin to hæmoglobin. Second (new), Bunge's theory, that the hæmoglobin of the blood is directly or indirectly derived from the iron holding nucleins of the vegetable kingdom. These nucleins are called hæmotogen. A deficiency in hæmoglobin, as illustrated in anæmia, is thought to be due to the fact that there is in the intestinal canal more or less putrefaction and fermentation. With this putrefaction alkaline sulphides are formed, the hæmotogen is decomposed, and the hæmoglobin supply shut off. Now, iron, and its salts, combine with the sulphur of the sulphides, and thus protects the hæmotogen from decomposition. According to this theory, iron is administered to protect the iron holding nucleins from decomposition, and not with the idea that the iron administered enters the system.

Preparations of iron are divided into two classes so far as regards their local effect, namely: The astringent, which are generally irritant as well; and the non-astringent, or bland preparations. Salts of the mineral acids are irritant, astringent, and styptic. Example: the chloride, sulphate, nitrate, as also the iodide, and bromide. The astringent preparations have a harsh, puckery, generally sour, and disagreeably inky taste, and tend to blacken, and corrode the teeth. They coagulate albumin and favor the formation of a clot when applied to an abraded surface or to a mucous membrane. They stimulate a healthy gastric mucous membrane, when used in moderate doses, increasing the appetite, and power of diges-

tion, but when the stomach is already weak and sensitive to all irritants, even small doses may act so unpleasantly as to have to be discontinued. In the bowels they cause constipation. In overdoses they act as irritant poisons.

The bland preparations have no such marked action—no irritation, and little if any astringency. Some have an inky taste, and blacken the teeth. They may cause constipation. All preparations that are insoluble, or but sparingly soluble in aqueous solutions, are locally bland. Example: reduced iron, the hydrated oxide, the carbonate, etc. Salts of the so-called organic acids—lactic, acetic, citric, and tartaric, as also the phosphate, and the pyrophosphate—are bland preparations; the lactate, and the acetate are less so than the others.

The insoluble preparations have practically no taste; have not the least astringency; and do not blacken the teeth. After entering the stomach they may be acted upon by the free hydrochloric acid of the gastric juice, and then become slowly changed into soluble salts capable of the full physiological action of iron.

All of the ferruginous preparations blacken the stools by the formation of sulphides, or tannates. This blackening of the stools is of no consequence, and the patient, or attendants, should be so informed, lest the unusual color should cause needless alarm.

#### PREPARATIONS.

Ferrum Reductum . . . . .	o 06—o 30 Gm. gr. i—v.
Ferri Oxidum Hydratum . . . . .	15.00—30.00 Gm. ℥ss—j.
Trochisci Ferri . . . . .	℥ = 0.30 Gm. gr. v.
Emplastrum Ferri (9 per cent.).	
Ferri Oxidum Hydratum cum Magnesia .	15.00—30.00 Gm ℥ss.—j.
Φ Ferrum Dialyzatum. . . . .	o.30—15.00 Cc. ℥v—℥ss.
Φ Ferri Acetas . . . . .	For pharmaceutical use.
Liquor Ferri Acetatis . . . . .	o.12—0.60 Cc. ℥ij—x.
Liquor Ferri et Ammonii Acetatis . .	15.00—30.00 Cc. ℥ss—i.
Ferri Carbonas Saccharatus . . . . .	o 30—0.95 Gm. gr. v—xv.
Massa Ferri Carbonatis . . . . .	o.12—0.30 Gm. gr. ij—v.
Mistura Ferri Composita . . . . .	15.00—30.00 Cc. ℥ss—j.
Pilula Ferri Carbonatis.	
Ferri Chloridum . . . . .	For pharmaceutical use.
Liquor Ferri Chloridi . . . . .	o 12—0.60 Cc. ℥ij—x.
Tinctura Ferri Chloridi . . . . .	o.30—0.60 Cc. ℥v—x.
Ferri Hypophosphis . . . . .	See the hypophosphites.
Syrupus Hypophosphitum cum Ferro.	See the hypophosphites.
Ferri Iodidum Saccharatum . . . . .	o.30—0.95 Gm. gr. v—xv.
Pilulæ Ferri Iodidi.	

Syrupus Ferri Iodidi . . . . .	0.60-1.90 Cc. ℥x-xxx.
Ferri Lactas . . . . .	0.12-0.30 Gm. gr. ij-v.
Liquor Ferri Nitratis . . . . .	0.30-0.95 Cc. ℥v-xv.
Ferri et Ammonii Sulphas . . . . .	0.12-0.30 Gm. gr. ij-v.
Ferri Sulphas . . . . .	0.06-0.12 Gm. gr. i-ij.
Ferri Sulphas Granulatus . . . . .	0.06-0.12 Gm. gr. i-ij.
Ferri Sulphas Exsiccatus . . . . .	0.03-0.06 Gm. gr. ss-j.
Liquor Ferri Subsulphatis . . . . .	0.12-0.30 Cc. ℥ij-v.
Liquor Ferri Tersulphatis . . . . .	For pharmaceutical use.
Ferri Valerianas . . . . .	0.06-0.12 Gm. gr. i-ij.
∅ Liquor Ferri Albuminati . . . . .	1.90-3.75 Cc. ʒss-i.
∅ Hæmogallol . . . . .	0.06-0.30 Gm. gr. i-v.

## THE SCALE PREPARATIONS.

Ferri Citras . . . . .	0.30-0.60 Gm. gr. v-x.
Liquor Ferri Citratis . . . . .	0.30-0.95 Cc. ℥v-xv.
Ferri et Ammonii Citras . . . . .	0.30-0.60 Gm. gr. v-x.
Vinum Ferri Citratis . . . . .	3.75-7.50 Cc. ʒi-ij.
Ferri et Ammonii Tartras . . . . .	0.30-0.60 Gm. gr. v-x.
Ferri et Potassii Tartras . . . . .	0.30-0.60 Gm. gr. v-x.
Ferri et Quininæ Citras . . . . .	0.30-0.60 Gm. gr. v-x.
Ferri et Quininæ Citras Solubilis . . . . .	0.30-0.60 Gm. gr. v-x.
Vinum Ferri Amarum . . . . .	3.75-7.50 Cc. ʒi-ij.
Ferri et Strychninæ Citras . . . . .	0.06-0.30 Gm. gr. i-v.
Ferri Phosphas Solubilis . . . . .	0.30-0.60 Gm. gr. v-x.
Syrupus Ferri Quininæ et Strychninæ	
Phosphatum . . . . .	1.90-3.75 Cc. ʒss-i.
Ferri Pyrophosphas Solubilis . . . . .	0.30-0.60 Gm. gr. v-x.

## FERRUM REDUCTUM.

**Reduced Iron.** Iron by Hydrogen. Quevenne's Iron.

It is metallic iron, with a variable amount of magnetic oxide of iron.

A very fine, grayish black, lustreless powder, permanent in dry air; without odor, or taste. Insoluble in water or alcohol; soluble in dilute acids with the evolution of hydrogen.

Prepared from iron oxide by passing hydrogen over it, while heated.

## ACTION.

Reduced iron is tasteless, bland, and convenient for medication. The acid of the gastric juice acts as a solvent and makes it medicinally active. Impure preparations give rise to the formation of gas, attended by agreeable eructations.

## USE.

It is used for its hæmatinic properties.

**FERRI OXIDUM HYDRATUM.  $\text{Fe}_2(\text{HO})_6$ .****Ferric Hydrate. Ferric Hydroxide.**

It is a brownish red magma ; insoluble in water, but wholly soluble in hydrochloric acid without effervescence.

It is obtained by treating, with an alkali, a solution of a ferric salt ; officially from the solution of ferric sulphate 10 parts, ammonia water 11 parts, and water a sufficient quantity. It should be freshly prepared as needed.

**ACTION.**

The hydrated oxide being insoluble in water is one of the bland preparations of iron. It undergoes but slight chemical change in the alimentary canal, and is in consequence a very feeble hæmatinic. Its medicinal value is largely due to the chemical reaction that takes place when it is brought in contact with arsenical compounds. It thus becomes a chemical antidote in arsenical poisoning. It also acts as a mechanical antidote by enveloping the arsenic and shielding the stomach until the bulk of the mass, or an emetic, causes its ejection.

**USE.**

As an antidote in acute arsenical poisoning, in large and frequently repeated doses.

**FERRI OXIDUM HYDRATUM CUM MAGNESIA.****Ferric Hydrate with Magnesia. (Arsenic Antidote.)**

Prepared from a solution of ferric sulphate and magnesia. The iron solution is mixed with twice its weight of water and kept in a bottle. The magnesia is rubbed with water to a firm and thin mixture and put into a bottle containing 32 ounces. When the preparation is wanted for use mix the two liquids by adding the magnesia mixture gradually to the iron solution, and shaking them together until a homogeneous mass is formed.

**ACTION.**

The hydrated oxide of iron with magnesia is no more active as a hæmatinic than is the preceding preparation, but as an antidote in arsenical poisoning is more efficient, for the excess of the alkaline precipitate is non-irritant, and is itself an antidote.

**USE.**

It is used as an antidote in acute arsenical poisoning.

**Φ FERRUM DIALYZATUM.****Ferric Oxychloride.**

It is a clear, reddish-brown solution ; odorless, practically tasteless, and perfectly bland. It mixes in all proportions with alcohol, water, glycerin



and simple syrup. On mixture with alkalies, many salts (notably common salt), and most organic matters, it is suddenly transformed into a soft, glutinous mass, resembling clotted blood in consistency and color; in this state it is not capable of absorption.

Dialyzed iron is a solution of ferric oxychloride in water. It is made by precipitating an aqueous solution of ferric chloride with ammonia water, shaking until the precipitate redissolves (formation of oxychloride), and then dialyzing over water, continuing the dialysis, with frequent changing of water, so long as any traces of hydrochloric acid remain. The product is then assayed, and, by the addition of water, brought to the standard strength of 10 per cent. of dry oxychloride.

#### ACTION.

Dialyzed iron is a very feeble hæmatinic, and is not so reliable in arsenical poisoning as the two preceding preparations, because the insoluble compounds that it forms with arsenic are not so stable in the presence of acids. It has the advantage, however, of always being ready for use, and for this reason may be ordered when neither of the other antidotes are at hand.

#### USE.

Dialyzed iron may be used as a hæmatinic, but it is inferior, as such, to many other iron preparations. It may be used as an antidote in acute arsenical poisoning.

### FERRI CARBONAS SACCHARATUS.

#### Saccharated Ferrous Carbonate.

Keep the product in small, well stoppered bottles.

It is a dull, greenish-gray powder, gradually oxidizing by contact with air; odorless, having at first a sweetish, afterward a slightly ferruginous taste, and a neutral reaction. Sparingly soluble in water; freely soluble, with copious evolution of carbon dioxide, in diluted hydrochloric acid.

Prepared from the ferrous sulphate by decomposing it with sodium bicarbonate, and adding sugar. Without the presence of sugar the carbonate of iron begins to change, as soon as it is precipitated, by the absorption of oxygen, and becomes ferric oxide, associated with a small quantity of ferrous carbonate which has escaped change.

In chalybeate waters we usually have the ferrous carbonate held in solution by the excess of carbon dioxide present. The rust-colored deposit which these waters yield is due to the ferric hydroxide, resulting from the decomposition of the carbonate.

**Massa Ferri Carbonatis** (Vallet's mass). This is a greenish-black, soft, pilular mass, containing about half its weight of ferrous carbonate, with sugar and honey. An excellent preparation. The ferrous

carbonate is precipitated, as in making the saccharated ferrous carbonate, but the syrup, by its presence throughout the whole process of making, secures a more perfect preservation of the ferrous salt.

**Mistura Ferri Composita** (Griffith's mixture). In this the ferrous carbonate, developed by the action of ferrous sulphate with potassium carbonate, is held in suspension. The mixture does not keep well, and should be freshly prepared when wanted.

**Pilulæ Ferri Carbonatis** (Blaud's pills. Chalybeate pills).

These pills are prepared from ferrous sulphate, and potassium carbonate, the ferrous carbonate being formed, as in the case of Griffith's mixture.

#### ACTION.

The ferrous carbonate, in some one of its many forms, is a most useful hæmatinic. It is but slightly astringent, and is non-irritating.

#### USE.

In anæmia and other conditions, when the internal use of iron is called for.

#### **FERRI ACETAS.** $\text{Fe}_2(\text{C}_2\text{H}_3\text{O}_2)_6$ .

This is official only in the following preparation:

**Liquor Ferri Acetatis.** Solution of Ferric Acetate.

An aqueous solution of ferric acetate, containing 33 per cent. of the anhydrous salt.

It is a dark, red-brown, transparent liquid; of an acetous odor, a sweetish, faintly styptic taste, and a slightly acid reaction.

It is made by saturating glacial acetic acid with freshly precipitated ferric hydrate and bringing the solution to standard strength by the addition of water.

#### ACTION.

Hæmatinic, astringent, and styptic.

#### USE.

Pharmaceutically it is used as a test for mineral acids. Locally, or internally, it may be used as an astringent, or styptic.

**Liquor Ferri et Ammonii Acetatis.** (Basham's mixture.)

This solution is an elegant elixir containing a small amount of iron in the form of the acetate.

It is a clear, reddish solution, of agreeable taste, with scarcely a trace of ferruginous flavor.

It is made with tincture of ferric chloride 2 parts, diluted acetic acid 3 parts, solution of ammonium acetate 20 parts, elixir of orange 10 parts, syrup 15 parts, water 50 parts.

## ACTION.

The liquor ferri et ammonii acetatis is hæmatinic, and diuretic.

## USE.

It may be used as a hæmatinic and diuretic in the anæmia of certain forms of albuminuria.

**FERRI CHLORIDUM.**  $\text{Fe}_2\text{Cl}_6 + 12\text{H}_2\text{O}$ .**Ferric Chloride.**

It should be kept in glass-stoppered bottles protected from light.

It occurs in orange-yellow, crystalline pieces, very deliquescent. Soluble in water, alcohol or ether; odorless, or having a faint odor of hydrochloric acid, with a strongly styptic taste, and an acid reaction.

Obtained by dissolving iron in hydrochloric acid, and oxidizing by nitric acid.

**Liquor Ferri Chloridi.** Solution of Ferric Chloride.

It contains 37.8 per cent. of anhydrous salt, corresponding to about 13 per cent. of metallic iron, with some free hydrochloric acid.

It is a reddish-brown liquid, having a faint odor of hydrochloric acid; an acid, strongly styptic taste, and an acid reaction. Sp. gr.: 1.387 at 15° C.

Obtained in the same way as the chloride of iron, only adding more water to terminate the process.

**Tinctura Ferri Chloridi.** Tincture of Ferric Chloride.

A hydro-alcoholic solution of ferric chloride ( $\text{Fe}_2\text{Cl}_6$ ) containing about 13.6 per cent. of the anhydrous salt, and corresponding to about 4.7 per cent. of metallic iron.

It is a bright brownish liquid, having a slightly ethereal odor, a very astringent styptic taste, and an acid reaction. Sp. gr.: about 0.960 at 15° C. It is decomposed by alkalies, astringent vegetable infusions, and mucilage of acacia.

Prepared from solution of ferric chloride, and alcohol. The product must stand, in a closely covered vessel, at least three months; it should then be transferred to glass-stoppered bottles, and protected from light. The object in keeping it so long is to allow time for the chemical reaction that takes place between the free hydrochloric acid, derived from the original iron solution, and the alcohol, by which an ethereal body is formed which gives the peculiar flavor to the tincture.

## ACTION.

The preparations of iron chloride are harsh styptics, and irritants. At the same time they are among the most valuable of the hæmatinics. They have the disadvantage of blackening and injuring the teeth; of causing

gastric irritation, and constipation. They may also cause irritation throughout the urinary tract. The destructive action on the teeth may be diminished by the use of glycerin, syrup, or a weak alkaline mineral water, like vichy water, as a vehicle.

#### USE.

The *liquor* is used pharmaceutically in preparing the official tincture. It may be used locally for its styptic properties.

Internally, it has no advantages over the tincture, and is seldom used. The *tincture* may be used locally for its astringent action.

Internally it is used as a hæmatinic in anæmia. It is also used in the treatment of diphtheria, erysipelas, and in some forms of chronic albuminuria.

### LIQUOR FERRI NITRATIS.

#### Solution of Ferric Nitrate.

An aqueous solution of ferric nitrate  $[\text{Fe}_2(\text{NO}_3)_6]$ , containing about 6 per cent. of the anhydrous salt, and corresponding to about 1.4 per cent. of metallic iron.

It is a transparent, amber-colored, or reddish liquid; without odor; having an acid, strongly styptic taste, and an acid reaction. Sp. gr. : 1.050 at  $15^\circ \text{C}$ .

Prepared by treating fresh, moist, ferric hydrate with nitric acid, and bringing the resulting solution of ferric nitrate to standard strength (6 per cent.) by adding a sufficient quantity of water.

#### ACTION.

Hæmatinic, astringent, and irritant, but to a less marked degree than are the preparations of the chloride.

#### USE.

Very limited.

### FERRI SULPHAS, $\text{FeSO}_4 + 7\text{H}_2\text{O}$ .

#### Ferrous Sulphate. Green Vitriol. Copperas.

It occurs in large, pale bluish-green prisms, efflorescent and absorbing oxygen on exposure to air; without odor; having a saline, styptic taste, and an acid reaction. Soluble in 1.8 parts of water at  $15^\circ \text{C}$ .; insoluble in alcohol. When quickly heated the crystals fuse; when slowly heated to  $115^\circ \text{C}$ . ( $239^\circ \text{F}$ .) they fall to powder and lose 38.84 per cent. of their weight (6 molecules of water of crystallization). It may be prepared from iron by dissolving in sulphuric acid.

**Ferri Sulphas Exsiccatus.** Approximately  $2\text{FeSO}_4 + 3\text{H}_2\text{O}$ . Dried Ferrous Sulphate.

Prepared by exposing the sulphate to a proper heat until the salt ceases to lose weight. It is a grayish white powder; slowly but completely solu-

ble in water, and answering to the reactions, and tests, of the sulphate. The crystallized sulphate yields about 61 per cent. of the dried sulphate.

**Ferri Sulphas Granulatus.**  $\text{FeSO}_4 + 7\text{H}_2\text{O}$ . Granulated Ferrous Sulphate.

This is a very pale, bluish-green, crystalline powder efflorescent in dry air, but when in contact with moisture gradually becoming oxidized; without odor, having a saline and styptic taste, and an acid reaction.

It should respond to the same reactions and tests as the sulphate. Prepared by pouring a solution of the ferrous sulphate slowly, with constant stirring, into alcohol; collecting, and drying the precipitate.

All of the ferrous sulphate salts should be kept in well-closed vessels.

#### ACTION.

Iron sulphate is an active hæmatinic. It is also astringent and irritant even to the poisonous degree. It has disinfectant properties to a limited degree.

#### USE.

Locally as an astringent.

Internally as a hæmatinic.

In cesspools, drains, etc., as a cheap disinfectant.

**Liquor Ferri Subsulphatis.** Solution of Basic Ferric Sulphate. (Monsel's solution.)

An aqueous solution of basic ferric sulphate (of variable chemical composition), and corresponding to about 13.6 per cent. of metallic iron.

A dark, reddish-brown liquid; odorless, or nearly so; of an acid, strongly styptic taste, and an acid reaction. Miscible in water, and alcohol, in all proportions, without decomposition. Sp. gr. : 1.550 at 15° C.

Prepared from ferrous sulphate by adding sulphuric acid, and oxidizing by heating with nitric acid, not using enough sulphuric acid to form tersulphate.

#### ACTION.

Liquor ferri subsulphatis is intensely styptic, but less irritating than the preparations of chloride. It has the general hæmatinic properties of iron.

#### USE.

Locally it is sometimes used for its styptic action.

Internally it has no advantages over other preparations, and is seldom used.

**Liquor Ferri Tersulphatis.** Solution of Ferric Sulphate.

An aqueous solution of normal ferric sulphate [ $\text{Fe}_2(\text{SO}_4)_3$ ], containing about 28.7 per cent. of the anhydrous salt, and corresponding to about 8 per cent. of metallic iron.



A dark reddish-brown liquid; almost odorless; having an acid, strongly styptic taste, and an acid reaction. Miscible with water, and alcohol, in all proportions. Sp. gr. : 1.320 at 15° C.

Prepared in the same way as the liquor ferri subsulphatis, only using more sulphuric acid.

#### ACTION.

Hæmatinic, styptic and irritant, with no advantages over other preparations already considered.

#### USE.

It is seldom used therapeutically. Pharmaceutically, it is used in preparing the official hydrated oxide of iron.

**FERRI ET AMMONII SULPHAS.**  $\text{Fe}_2(\text{NH}_4)_2(\text{SO}_4)_4 + 24\text{H}_2\text{O}$ .

**Ferric Ammonium Sulphate.** Ammonio-Ferric Alum. Iron Alum.

It occurs in pale violet crystals, efflorescent on exposure to air; odorless; having an acid, styptic taste, and a slightly acid reaction. Soluble in 2 parts of water at 15° C.; insoluble in alcohol.

Obtained from ferric sulphate, and ammonium sulphate, by heating them together.

#### ACTION.

This salt has the peculiar astringency, without excessive irritation, of the true alums.

#### USE.

Locally it is used as an astringent, or styptic.

#### FERRI IODIDUM SACCHARATUM.

**Saccharated Ferrous Iodide.**

This preparation must be kept in well-stoppered bottles, in a cool, dark place. The ferrous iodide, like the ferrous carbonate, is very unstable, and for this reason the sugar is added.

It is a yellowish-white, or grayish, very hygroscopic powder; without odor, and having a sweetish ferruginous taste. Soluble in 7 parts of water at 15° C.; sparingly soluble in alcohol.

Prepared from iron, reduced iron, iodine, sugar of milk, and water.

**Syrupus Ferri Iodidi.** Syrup of Ferrous Iodide.

This is a transparent, pale-green liquid; odorless; having a sweet, strongly ferruginous taste, and a neutral reaction. Sp gr.: about 1.353 at 15° C.

Prepared from iron, iodine and syrup, much in the same way as the saccharated iodide of iron. It contains about 10 per cent. of the ferrous iodide ( $\text{FeI}_2$ ). It is a very unstable preparation, and on exposure to air the iodide is partially decomposed, iodine being set free and the iron oxidized. The decomposition is attended by a change in color from green to yellow, or even brown.

This syrup should be kept in small, well-stoppered vials, which should be completely filled.

**Pilulæ Ferri Iodidi.** Pills of Ferrous Iodide. Blanchard's Pills.

Each pill contains about 1 grain of ferrous iodide, and  $\frac{1}{2}$  grain of reduced iron.

#### ACTION.

Iodide of iron has the action of iodine as well as that of iron. It is irritant without much astringency, and tends rather to relax the bowels than to cause constipation.

#### USE.

It is used in the treatment of anæmia associated with struma.



#### Ferrous Lactate.

It should be kept in well-stoppered bottles.

It occurs as pale, greenish-white, crystalline crusts, or grains; permanent in the air; odorless; having a mild, sweetish, ferruginous taste, and a slightly acid reaction. Soluble in 40 parts of water at 15° C. in 12 parts of boiling water; almost insoluble in alcohol.

Prepared from iron by dissolving in lactic acid.

#### ACTION.

That of a feeble hæmatinic.

#### USE.

Practically it has no therapeutic use. It is used pharmaceutically in preparing the official syrup of the hypophosphates with iron.

#### FERRI VALERIANAS.

#### Ferric Valerianate.

It must be kept in close-stoppered bottles, in a cool, dark place.

It occurs as a dark tile-red, amorphous powder of somewhat varying chemical composition; permanent in dry air; having a faint odor of valerianic acid, and a mildly styptic taste. Insoluble in cold water but soluble in alcohol. Decomposed by hot water, valerianic acid being set free, leaving ferric hydrate.

Prepared from ferrous sulphate, by decomposing with sodium valerianate.

#### ACTION.

That of a feeble Hæmatinic.

#### USE.

There is no reason why it should be used therapeutically.

## THE SCALE PREPARATIONS.

All of the so-called scale preparations are obtained by reducing solutions of the drug, by evaporation, to the consistence of syrup, then spreading on glass, or porcelain plates, and drying.

## FERRI CITRAS.

**Ferric Citrate.**

It occurs in the form of transparent, garnet-red scales; permanent in the air; odorless; having a very faint ferruginous taste, and an acid reaction. Slowly but completely soluble in cold water; readily soluble in boiling water; insoluble in alcohol.

It is prepared from the solution of the citrate of iron by evaporation.

**Liquor Ferri Citratis.** Solution of Ferric Citrate.

An aqueous solution of ferric citrate containing about 35 per cent. of the anhydrous salt.

A dark brown liquid; odorless; possessing a ferruginous taste, and an acid reaction. Sp. gr. about 1.250 at 15° C.

Prepared by mixing fresh, and moist, ferric hydrate with citric acid. This mixture is heated and stirred until a solution is formed; such solution is then reduced by evaporation to standard strength and dried upon plates.

## ACTION.

That of a bland hæmatinic.

## USE.

Very limited because not sufficiently active.

## FERRI ET AMMONII CITRAS.

**Iron and Ammonium Citrate.**

It must be kept in well-stoppered bottles in a cool place.

It occurs in transparent, garnet red scales; odorless; having a saline, mildly ferruginous taste, and a neutral reaction. Deliquescent on exposure to moist air; completely soluble in water; insoluble in alcohol.

Prepared by evaporation of a solution of ferric citrate with ammonia water.

**Vinum Ferri Citratis.**

This is a 4 per cent. solution of iron and ammonium citrate, in a mixture of tincture of sweet orange peel, syrup, and white wine.

## ACTION.

That of a bland hæmatinic.

## USE.

This preparation has no therapeutic use. Pharmaceutically it is used in preparing the iron and strychnine citrate.

**FERRI ET AMMONII TARTRAS.****Iron and Ammonium Tartrate.**

It should be kept in well-stoppered bottles, protected from light.

It occurs in thin, transparent scales, varying in color from garnet-red to reddish-brown; odorless; of a sweetish, slightly ferruginous taste, and neutral reaction. It is slightly deliquescent; very soluble in water; insoluble in alcohol.

Obtained by adding the solution of ferric sulphate to diluted ammonia water, and adding the moist ferric hydrate thus formed to diluted tartaric acid.

**ACTION.**

That of a bland hæmatinic.

**USE.**

Therapeutically it is but little used.

**FERRI ET POTASSII TARTRAS.****Iron and Potassium Tartrate.** Potassio-Ferric Tartrate.

The product should be kept in well-stoppered bottles, protected from light.

It occurs in thin, transparent scales, varying in color from garnet-red to reddish-brown; without odor, and having a sweetish, slightly ferruginous taste. Slightly deliquescent in moist air; very soluble in water; insoluble in alcohol.

Obtained by adding fresh hydrated oxide to a solution of potassium bitartrate.

**ACTION.**

That of an agreeable, and bland hæmatinic.

**USE.**

It may be used as a mild hæmatinic.

**FERRI ET QUININÆ CITRAS.****Iron and Quinine Citrate.**

Keep the product in well-stoppered bottles, protected from light.

It occurs in thin, transparent scales, of a reddish-brown color; odorless; with a bitter, mildly ferruginous taste, and a slightly acid reaction. Slowly but completely soluble in cold water; sparingly soluble in alcohol.

Prepared from ferric citrate, quinine, citric acid, and water. It contains 12 per cent. quinine.

**FERRI ET QUININÆ CITRAS SOLUBILIS.****Soluble Iron and Quinine Citrate.**

Keep the product in well-stoppered bottles, protected from light.

It occurs in thin, transparent scales of a greenish, golden-yellow

color; odorless; having a bitter, mildly ferruginous taste, and an acid reaction.

Prepared from ferric citrate, quinine, citric acid, ammonia water, and water. It contains 12 per cent. quinine.

### **Vinum Ferri Amarum.** Bitter Wine of Iron.

Prepared from soluble iron and quinine citrate, tincture of sweet orange peel, syrup, and white wine. It contains 5 per cent. of the soluble iron and quinine citrate.

#### **ACTION.**

The iron and quinine citrate preparations combine the action of a bland hæmatinic and a bitter tonic.

#### **USE.**

They are sometimes used when both iron and quinine are indicated. As a rule, however, it is better to prescribe these drugs in such amounts as are needed, and not in fixed proportions as in this preparation.

### **FERRI ET STRYCHNINÆ CITRAS.**

#### **Iron and Strychnine Citrate.**

It must be kept in well-stoppered bottles, in a cool place.

It occurs in transparent, garnet-red scales; odorless; having a bitter and slightly ferruginous taste, and a slightly acid reaction. Deliquescent in moist air. Soluble in water; slightly soluble in alcohol. 100 parts contain of iron and ammonium citrate 98 parts, of strychnine 1 part.

Prepared by combining iron and ammonium citrate, strychnine, and citric acid, in solution. This solution is evaporated, and the residue collected in the form of scales.

#### **ACTION.**

That of a bland hæmatinic, and of strychnine.

#### **USE.**

Like the iron and quinine preparations there is but little use for this combination. It is better to prescribe the iron and strychnine separately, as needed.

### **FERRI PHOSPHAS SOLUBILIS.**

#### **Soluble Ferric Phosphate.**

It should be kept in dark, amber-colored, well-stoppered bottles.

It occurs in thin, bright green, transparent scales; without odor, and having an acidulous, slightly saline taste. Permanent in dry air when excluded from light. Freely and completely soluble in water, but insoluble in alcohol.

Obtained by mixing solutions of sodium phosphate, and of ferric citrate.



## ACTION.

That of a bland hæmatinic.

## USE.

Pharmaceutically, as one of the ingredients of the official syrup of the phosphate of iron, quinine, and strychnine.

**FERRI PYROPHOSPHAS SOLUBILIS.****Soluble Ferric Pyrophosphate.**

It should be kept in well-stoppered bottles in a dark place.

It is in the form of thin, apple-green, transparent scales; permanent in dry air when excluded from light, but turning dark on exposure to light; odorless; having an acidulous, slightly saline taste, and a slightly acid reaction. Soluble in water, but insoluble in alcohol.

It is a composite preparation obtained from solutions of ferric citrate and sodium pyrophosphate.

## ACTION.

That of a bland hæmatinic only.

## USE.

This is a favorite preparation when the use of a bland hæmatinic is called for.

**Φ LIQUOR FERRI ALBUMINATI.****Solution of Iron Abuminate.**

A brownish liquid, non-astringent, non-irritant, with a not unpleasant taste.

Obtained by mixing solutions of egg albumin and iron oxychloride, and heating the precipitate with soda. It contains the equivalent of about 4 per cent. of metallic iron.

## ACTION.

That of a bland hæmatinic.

## USE.

Where hæmatinics are indicated.

**Φ HÆMOGALLOL.**

This is hæmoglobin deoxidized; a reddish-brown powder.

## ACTION.

That of a hæmatinic. It is rapidly absorbed. After entering the circulation, it takes up oxygen and becomes active hæmoglobin again. Many advantages are claimed, for this new preparation, over the iron preparations.

## USE.

In all cases where hæmatinics are indicated.

**MANGANUM. Mn.**

Manganese is quite abundant in nature in an oxidized state, entering into the composition of several minerals. The metal is obtained by reducing its oxide, by heating it to redness with charcoal. It is hard, grayish-white in color; looks like cast-iron, and is very brittle. The metal is not official.

*General action of the manganese salts.* The manganese salts are supposed by some to have the general action of the iron salts.

**PREPARATIONS.**

Mangani Dioxidum . . . . .	0.18-0.30 Gm. gr. iij-v.
Mangani Sulphas . . . . .	0.06-0.12 Gm. gr. i-ij.
Potassii Permanganas . . . . .	0.01-0.06 Gm. gr. $\frac{1}{6}$ -i.

**MANGANI DIOXIDUM.**

**Manganese Dioxide.** Black Oxide of Manganese.

It is a heavy, grayish-black, more or less gritty powder; permanent in the air; odorless, and tasteless. Insoluble in water or alcohol. When heated with hydrochloric acid it is converted into manganous chloride with the development of chlorine. At a red heat the dioxide gives off oxygen gas.

This is the native crude manganese dioxide, containing at least 66 per cent. of the pure dioxide ( $\text{MnO}_2$ ).

**ACTION.**

This is a bland and unirritating preparation. It is supposed to act as a hæmatinic, and also as an emmenagogue.

**USE.**

In anæmia, as an adjunct to iron preparations. In amenorrhœa dependent upon functional disturbances, or upon anæmia.

**MANGANI SULPHAS.  $\text{MnSO}_4 + 4\text{H}_2\text{O}$ .**

**Manganese Sulphate.**

It should be kept in well-stoppered bottles.

It occurs in colorless, or pale rose-colored, transparent prisms, slightly efflorescent in dry air; odorless; having a slightly bitter, and astringent taste, and a faintly acid reaction. Soluble in 0.8 part of water at  $15^\circ \text{C}$ .; insoluble in alcohol.

Prepared by dissolving the impure protoxide ( $\text{MnO}$ ) in sulphuric acid, with the addition of a little hydrochloric acid.

**ACTION.**

Manganese sulphate has an irritant action upon the gastric and intestinal mucous membrane, and causes purgation. To it is also attributed the

hæmatinic properties of manganese salts. Its reputed cholagogue action is very doubtful.

#### USE.

It has been used, without any very good reason, as a purgative in jaundice.

#### POTASSII PERMANGANAS. $\text{KMnO}_4$ .

##### Potassium Permanganate.

It should be kept in glass-stoppered bottles protected from light.

It occurs in deep purple, violet or nearly black, needle-shaped prisms, of a metallic lustre; permanent in the air; odorless, having a sweet, afterward disagreeable, astringent taste, and a neutral reaction. Soluble in 16 parts of water at  $15^\circ \text{C}$ ., and in 3 parts of boiling water; decomposed by alcohol. When heated, the salt decrepitates, and at  $240^\circ \text{C}$ . ( $464^\circ \text{F}$ .) it decomposes, yielding oxygen, potassium manganate, and manganese dioxide.

The aqueous solution of the salt is of a deep violet-red color when concentrated, and of a rose color when much diluted, and this color is discharged by hydrogen sulphide, ferrous sulphate, oxalic acid, alcohol, and many other readily oxidizable substances, especially if the solution be first rendered acid by sulphuric acid. It should not be triturated, nor combined in solution, with organic, or readily oxidizable substances.

It is obtained by combining potassa, manganese dioxide, potassium chlorate, diluted sulphuric acid, and water.

#### ACTION.

Potassium permanganate is an oxidizer, an irritant, and a mild caustic. At the same time it has the general action of manganese dioxide. As an oxidizer it is a deodorant, and a fleeting antiseptic. It is a useful antidote in poisoning by morphine, strychnine and many other organic poisons. It is an efficient antidote against the poison of venomous serpents. In poisoning, in order to be effective, the drug should be given before absorption has taken place.

#### USE.

A saturated solution may be used as a disinfectant for the hands of the operator, in surgical practice. Weak solutions ( $\frac{1}{4}$  to 5 per cent.) may be used as a deodorant and antiseptic wash for ill-conditional ulcers, foetid rhinitis, gangrene, etc.

Internally it may be used in the treatment of atonic amenorrhœa, but its irritant properties must be kept in mind, otherwise there may be considerable gastric distress. In poisoning from morphine or other alkaloids 0.18–0.24 Gm. (3 or 4 grains) of the potassium permanganate, in a weak

solution, should be swallowed at once. Inasmuch as many of the organic poisons after absorption are excreted in part by the gastric mucous membrane the use of this antidote may be continued from time to time as an adjunct to other treatment. As an antidote to the poison of venomous serpents a 1 per cent. solution should be injected hypodermatically about the wound before the poison is absorbed.

#### AURII ET SODII CHLORIDUM.

##### Gold and Sodium Chloride.

It should be kept in well-stoppered vials.

A mixture composed of equal parts of dry gold chloride ( $\text{AuCl}_3$ ) and sodium chloride ( $\text{NaCl}$ ).

It is an orange-yellow powder ; odorless, with a saline, and metallic taste, and a slightly acid reaction. It is slightly deliquescent in damp air. Very soluble in water, and soluble in alcohol.

It may be prepared by dissolving gold in nitro-hydrochloric acid, etc., and then adding a solution of common salt.

Dose.—0.001–0.005 Gm. gr.  $\frac{1}{60}$ – $\frac{1}{12}$ .

##### ACTION.

This salt is antiseptic. It increases secretion. It is supposed to closely resemble mercury in its general action.

##### USE.

Gold and sodium chloride has no extensive therapeutic use.

## PART IV.

### NON METALLIC ELEMENTS.

#### Φ OXYGEN. O.

This is a colorless, odorless, tasteless, and respirable gas. Prepared by heating potassium chlorate with manganese dioxide. The manganese merely aids in the decomposition of the potassium salt, and takes no part in the reaction. Oxygen may be collected in a gasometer, or it may be condensed in iron cylinders, and withdrawn as wanted.

#### ACTION.

It is an active oxidizer. Applied to the unbroken skin it has but little action, but to a wound it acts as a stimulant, and increases the circulation through the part. Inhaled it causes a slight feeling of warmth in the mouth, extending downward over the body. Sometimes nervous symptoms may appear, due to an excess of oxygen respired.

#### USE.

It is used by inhalation in asphyxia, whether due to pneumonia, phthisis, diphtheria, or to poisoning by coal gas, opium, hydrocyanic acid, etc. One to two gallons may be administered once or twice daily, or in case of poisoning requiring its use, half a gallon may be administered every half hour, as needed.

For further use of oxygen, see aqua hydrogenii dioxide.

#### Φ HYDROGENII DIOXIDUM. $H_2O_2$ .

##### Hydrogen Dioxide.

It is a colorless, transparent, odorless, syrupy, extremely unstable fluid, with a harsh, bitter taste, and a neutral reaction. Sp. gr. : 1.452. Soluble in water, and in ether. The ethereal solution is more stable than the aqueous solution.

#### AQUA HYDROGENII DIOXIDI.

##### Solution of Hydrogen Dioxide.

It should be kept in well-stoppered bottles, in a cool place.

A slightly acid aqueous solution of hydrogen dioxide ( $H_2O_2$ ), containing, when freshly prepared, about 3 per cent., by weight, of pure hydrogen dioxide, corresponding to about 10 volumes of available oxygen.



A colorless liquid, without odor, slightly acidulous to the taste, and producing a peculiar sensation, and soapy froth, in the mouth. Liable to deteriorate by age, exposure to heat, or protracted agitation. Sp. gr.: 1.006 to 1.012 at 15° C.

A small amount of free acid is purposely allowed to remain in it for preservation.

Many of the solutions are worthless because the  $\text{H}_2\text{O}_2$  is soon decomposed into water and oxygen. A simple test of its activity is to place a few crystals of potassium permanganate in a test tube and add four to eight grammes of the solution. The violence of the resulting effervescence is in direct ratio to its value as a remedial agent.

Prepared from barium dioxide, through the action of phosphoric, and diluted sulphuric acid.

#### ACTION.

That of oxygen. The preparations of hydrogen dioxide readily give off oxygen. Added to pus, it causes disintegration, with effervescence.

#### USE.

The therapeutic use of this preparation depends upon its instability. It may be used locally for its cleansing and antiseptic action.

### ☛ NITROUS OXIDE. $\text{N}_2\text{O}$ .

**Nitrogen Monoxide.** Laughing Gas.

It is a colorless, inodorous gas, with a slightly sweetish taste. Prepared by heating ammonium nitrate sufficiently to decompose it, not exceeding 204.4° C. (400° F.), collecting and washing the resulting gas, which may be condensed to the liquid form by pressure, and kept in strong iron flasks, from which it is allowed to escape into a properly constructed gas bag, for use as wanted.

#### ACTION.

When inhaled it rapidly enters the circulation. It combines with the oxygen of the red blood corpuscles, without itself uniting with the hæmoglobin, and thus produces partial asphyxia, which is followed by anæsthesia. It does not interfere with the production, or elimination, of carbon dioxide. It must be given without the admixture of air. The result of this action on the blood is to affect the nervous centres, first stimulating them, and then producing anæsthesia. The first stage is characterized by fits of involuntary laughing, shouting, etc. When the gas is discontinued the anæsthetic effect quickly passes off, and a period of excitement may again come on as the patient breathes the pure air.

#### USE.

Nitrous oxide is sometimes used as an anæsthetic in minor surgical

operations. It is more frequently used by dentists for its anæsthetic properties during the extraction of teeth.

### CARBON. C.

This element is used in medicine in the form of animal and vegetable charcoal.

#### PREPARATIONS.

*Carbo Animalis.*

*Carbo Animalis Purificatus*, . . . 0.12–1.90 Gm. gr. ij–xxx.

*Carbo Ligni*, . . . . . 0.12–1.90 Gm. gr. ij–xxx.

**Carbo Animalis.** Animal Charcoal. Bone Black.

It occurs as dull black, granular fragments, or as a dull black powder ; odorless, nearly tasteless, and insoluble in water or alcohol. When ignited it leaves a grayish ash, amounting to about 85 per cent. of the original weight of the portion taken. The ash should be soluble in hydrochloric acid with the aid of heat, leaving not more than a trifling residue.

It is the residue of bones which have been exposed to a red heat without the access of air.

**Carbo Animalis Purificatus.** Purified Animal Charcoal

This is a dull black powder ; odorless, tasteless, and insoluble.

Prepared by dissolving out the earthy matters from bone-black with hydrochloric acid, washing, and drying the product. It should be kept in well-stoppered bottles.

#### ACTION.

It is a decolorizer, and an antidote in poisoning by the alkaloids.

#### USE.

It may be used in the treatment of poisoning by alkaloids.

**Carbo Ligni.** Charcoal.

Prepared from soft wood by burning it without the free access of air. The volatile portions of the wood—oxygen and hydrogen—are dissipated, and the carbon is left behind.

It is a black powder ; odorless, tasteless and insoluble.

#### ACTION.

In the dry state it has the power of absorbing gases, and is thus a deodorizer. It absorbs oxygen and parts with it readily in the presence of oxidizable substances, thus having an antiseptic, and also a deodorizing action. Saturation with water is very difficult, consequently its oxidizing power may be present in fluids to which it has been freshly added. In the

stomach it has also a mechanical action, removing mucus, stimulating the circulation, and increasing peristalsis.

It should be reheated immediately before use, to expel the gases condensed in its pores which would diminish its absorbing properties.

#### USE.

Locally, it may be used as an antiseptic dressing; a cheese-cloth bag containing powdered charcoal may be applied to gangrenous, or sloughing, sores.

Internally, it may be used in catarrhal, and fermentative diseases of the stomach. The dose required, to be efficient, must be bulky, and there is no reason why charcoal should ever be given internally with so many other efficient drugs at our disposal.

#### CARBONEI DISULPHIDUM. $CS_2$ .

##### Carbon Disulphide.

It should be kept in well-stoppered bottles, or in tin cans, in a cool place, remote from light and fire.

It is a clear, colorless, highly refractive liquid; very diffusive; having a strong, characteristic, but not fetid odor, a sharp, aromatic taste, and a neutral reaction. Soluble in 535 parts of water at  $15^{\circ}C$ .; very soluble in alcohol, ether, chloroform, fixed and volatile oils. Sp. gr.: 1,268–1,269 at  $15^{\circ}C$ . It vaporizes readily at the ordinary temperature; is highly inflammable, and when ignited produces carbon and sulphur dioxide.

It is prepared by the direct combination of carbon and sulphur, at a moderate red heat.

#### ACTION.

Carbon disulphide is a powerful agent of the general type of the volatile alcohols and ethers.

Locally, it is irritant, but also anæsthetic. It is also antiseptic.

Internally, its narcotic properties are so pronounced as to make it an undesirable remedy.

#### USE.

Locally, to produce anæsthesia, it may be employed as an atomized vapor. Pain precedes the anæsthesia.

It may be used for the relief of neuralgia, headache, etc. It has been used to lessen the swelling of enlarged lymphatic glands.

#### SULPHUR. S.

An elementary substance which occurs in nature as a brittle, crystalline solid.

*Sources.*—It is found native in volcanic districts. It is also found in

combination with other elements, chiefly in the form of sulphates, and sulphides.

*General Action.*—Sulphur is a parasiticide, an antiseptic locally and along the lines of elimination, a vascular stimulant, a diaphoretic, an expectorant, and a laxative. Its action is due to mechanical irritation, to the formation of sulphides, or of sulphur dioxide.

#### PREPARATIONS.

Sulphur Sublimatum . . . . .	For pharmaceutical use.
Sulphur Lotum . . . . .	3.75–7.50 Gm. ʒi–ij.
Pulvis Glycyrrhizæ Compositus . .	See Senna.
Unguentum Sulphuris . . . . .	For external use.
Sulphur Præcipitatum . . . . .	3.75–7.50 Gm. ʒi–ij.
Sulphuris Iodidum . . . . .	For external use.
ϕ Hydrogen Sulphide.	
Calx Sulphurata . . . . .	0.01–0.03 Gm gr. $\frac{1}{6}$ – $\frac{1}{2}$ .
Potassa Sulphurata . . . . .	0.03–0.18 Gm. gr. $\frac{1}{2}$ –ij.
ϕ Sulphur Dioxide.	
Acidum Sulphurosum . . . . .	0.30–3.75 Cc. ℥v–ʒi.
Sodii Sulphis . . . . .	0.30–1.90 Gm. gr. v–xxx.
Sodii Bisulphis . . . . .	0.30–1.90 Gm. gr. v–xxx.
Sodii Hyposulphis . . . . .	0.30–1.90 Gm. gr. v–xxx.

#### SULPHUR SUBLIMATUM. S.

**Sublimed Sulphur.** Brimstone. Flowers of Sulphur.

It is a fine, yellow powder, having a slight, characteristic odor, a faintly acid taste, and an acid reaction. Insoluble in water; slightly soluble in absolute alcohol. When ignited it burns with a blue flame, forming sulphur dioxide ( $\text{SO}_2$ ).

Prepared by volatilizing crude sulphur in an apparatus so arranged that the vaporized sulphur will condense in the form of a powder on the walls of the receiving chamber.

#### ACTION.

This has the general action of sulphur, (*q. v.*) It always contains some sulphuric acid, and is thus rendered unfit for internal use.

#### USE.

For the disinfection of rooms and clothing, sulphur is burned; sulphur dioxide, the active disinfecting agent, is the product of this combustion.

#### SULPHUR LOTUM. S.

**Washed Sulphur.**

This is simply sublimed sulphur, freed from impurities by washing it with diluted ammonia water, drying the product, and passing it through a

No. 30 sieve. The ammonia not only neutralizes any sulphurous, or sulphuric acid present, but it also dissolves out, and removes, arsenic sulphide, which may be present.

It is a fine, yellow powder; odorless and tasteless. Insoluble in water; slightly soluble in absolute alcohol.

**Pulvis Glycyrrhizæ Compositus.** Compound Liquorice Powder, contains 8 per cent. of washed sulphur (see Senna).

**Unguentum Sulphuris.** Sulphur Ointment, contains 30 per cent. of washed sulphur in benzoated lard.

#### ACTION.

This has the general action of sulphur (See p. 138). It is the most satisfactory of the sulphur preparations as a laxative.

#### USE.

Externally it may be used as a parasiticide in the form of the official ointment, or better still because less irritating, as a weaker sulphur ointment in combination with other parasiticides. It is also used in chronic skin diseases, as in psoriasis, chronic eczema, etc., when local stimulation is required. This is the most agreeable form of sulphur for internal administration. It is a useful laxative, especially in the treatment of hæmorrhoids; the stool produced is soft and pultaceous. It may be combined with rhubarb, or potassium bitartrate, or with senna as in the official compound liquorice powder.

#### SULPHUR PRÆCIPITATUM. S.

**Precipitated Sulphur.** Milk of Sulphur. Lac Sulphur.

It is a fine, amorphous powder, of a pale yellow color, without odor or taste. Insoluble in water; slightly soluble in absolute alcohol.

Obtained by precipitating, with diluted hydrochloric acid, a solution of sulphur salts of calcium (from sublimed sulphur, 100 parts; calcium, 50 parts). The sulphur, after precipitation, is collected upon a strainer, thoroughly washed with water, and dried at a gentle heat.

The product should be kept in well-stoppered bottles.

#### ACTION.

This has the general action of sulphur (See p. 138). When freshly prepared it is a pleasant laxative like the washed sulphur, but upon keeping it tends to develop an acid, and this gives it a harsh action.

#### USE.

Quite similar to that of the washed sulphur.



**SULPHURIS IODIDUM.****Sulphur Iodide.**

This is a mixture of sulphur and iodine. It must be kept in a glass-stoppered bottle, in a cool place.

It occurs in brittle masses, grayish-black, having the odor of iodine, and a somewhat acrid taste. Almost insoluble in water; soluble in 60 parts of glycerin. Alcohol and ether dissolve out the iodine, leaving the sulphur. On exposure to air it gradually loses iodine.

Prepared by fusing together a mixture of 1 part of washed sulphur and 4 parts of iodine. The fused mass, after cooling, is broken into small pieces.

**ACTION.**

Sulphur iodide has the action of free iodine, and free sulphur. It is therefore an antiseptic, a parasiticide, an irritant, and a mild alterative.

**USE.**

It may be used as an ointment (2 to 10 per cent.) in certain chronic skin diseases, especially those of a tubercular, or syphilitic type.

**Φ HYDROGEN SULPHIDE.  $H_2S$ .****Sulphureted Hydrogen.**

This is a colorless non-respirable gas, with the odor and taste of rotten eggs.

Obtained by treating ferrous sulphide with diluted hydrochloric acid.

**ACTION.**

Hydrogen sulphide acts as a vascular stimulant, a parasiticide, an antiseptic, and an irritant even to the corrosive degree. It causes an increased secretion from the intestinal glands, and also increased peristalsis. It acts as a diaphoretic, and diuretic. It is in part absorbed, and may cause emaciation, and debility, through interference with oxidation. Excretion takes place through the skin, the kidneys, the bronchial, and the intestinal mucous membrane, either in an unchanged state or as sulphates. Calx sulphurata and potassa sulphurata are the drugs used to secure the action of the sulphides.

**CALX SULPHURATA.****Sulphurated Lime. Crude Calcium Sulphide.**

A mixture containing at least 60 per cent. of calcium monosulphite ( $CaS$ ), together with unchanged calcium sulphate ( $CaSO_4$ ), and carbon, in varying proportions.

It is a pale gray powder, exhaling a faint odor of hydrogen sulphide,

having a nauseous, alkaline taste. Slightly soluble in water; insoluble in alcohol.

Prepared by heating to a bright-red heat, in a closed crucible, a mixture of dried calcium sulphate, charcoal, and starch.

The product should be kept in small, glass-stoppered vials.

#### ACTION.

Sulphurated lime has the general action of hydrogen sulphide (see p. 140). It is irritant. It tends to prevent suppuration, or if this is not possible, to hasten the reparative process when suppuration already exists.

#### USE.

It may be used in the treatment of boils, indolent abscesses, glandular enlargements, etc.

#### POTASSA SULPHURATA.

**Sulphurated Potassa.** Liver of Sulphur.

It should be kept in well-stoppered bottles.

It forms irregular pieces of liver-brown color, which, by exposure to the air, gradually absorb moisture, oxygen, and carbon dioxide, and change to a greenish-yellow, and finally to a gray mass, containing potassium carbonate, hyposulphite, and sulphate. It has a faint odor of hydrogen sulphide, a bitter, alkaline taste, and an alkaline reaction.

Prepared by mixing together dried potassium carbonate and sublimed sulphur, gradually heating the mixture until it is completely melted, then pouring the liquid on a marble slab, and when cooled and solidified, breaking the mass into irregular pieces.

#### ACTION.

Sulphurated potassa has the general action of hydrogen sulphide (see p. 140).

#### USE.

In the bath it may be used (1 in 10,000 to 1 in 1,000 parts of water with the addition of a little sulphuric acid to favor the formation of hydrogen sulphide) in the treatment of chronic lead, or mercury poisoning, rheumatism, certain skin diseases, etc. Wooden bath-tubs must be used. A wash or an ointment (5 to 20 per cent.) may be used instead of the bath in the treatment of chronic skin diseases.

Internally, it has no advantage over the calx sulphurate, and is, in fact, but little used.

#### Φ SULPHUR DIOXIDE. $\text{SO}_2$ .

(Incorrectly called sulphurous acid gas.)

It is a colorless gas, with a characteristic, sulphurous odor, offensive to the nostrils, and non-respirable. It dissolves freely in water, forming, in the process of solution, an acid body, sulphurous acid ( $\text{H}_2\text{SO}_3$ ).

It is the product of the combustion of sulphur in air.

## ACTION.

Anhydrous sulphur dioxide has no disinfectant properties, but 1 per cent. of the gas in the presence of moisture, through the formation of sulphurous acid gas ( $\text{H}_2\text{SO}_3$ ), becomes active as an aerial disinfectant. It will destroy bacteria, but not spores.

## USE.

Sulphur dioxide is used in the presence of moisture to disinfect rooms, clothing, etc., after contagious diseases.

## ACIDUM SULPHUROSUM.

**Sulphurous Acid.**

A liquid composed of not less than 6.4 per cent., by weight, of sulphurous acid gas (Sulphur Dioxide,  $\text{SO}_2$ ) and not more than 93.6 per cent. of water.

A colorless liquid, of the characteristic odor of burning sulphur, and of a very acid, sulphurous taste. Sp. gr.: not less than 1.035 at  $15^\circ \text{C}$ . Litmus paper moistened with the acid is first reddened and afterwards bleached.

Prepared by deoxidizing sulphuric acid by means of charcoal, and passing the resulting fumes into water.

It should be kept in dark, amber-colored, glass-stoppered bottles, in a cool place, protected from light.

## ACTION.

Sulphurous acid has the action of a deodorant, and disinfectant.

## USE.

It is sometimes used externally in the treatment of parasitic skin diseases, syphilitic ulcers, etc. (a 25 to 50 per cent. solution). It is also used as a spray (50 per cent. solution) for its antiseptic and stimulating action, in diseases of the throat,—catarrhal, syphilitic, or diphtheritic.

**Sodii Sulphis.** Sodium Sulphite,  $\text{Na}_2\text{SO}_3 + 7\text{H}_2\text{O}$ .

It occurs in colorless, transparent prisms; odorless, and having a cooling, saline, sulphurous taste. In air the salt effloresces, and is slowly oxidized into the sulphate. Soluble in 4 parts of water at  $15^\circ \text{C}$ .; sparingly soluble in alcohol. The aqueous solution is neutral, or feebly alkaline.

It should be kept in well-stoppered bottles, in a cool place. It may be prepared by passing sulphur dioxide into a solution of sodium carbonate until saturated, forming sodium bisulphite (sodii bisulphis). An equal weight of sodium carbonate now added forms a solution of the sodium sulphite, which is to be evaporated and crystallized out.

**Sodii Bisulphis.** Sodium Bisulphite.  $\text{NaHSO}_3$ .

It occurs as opaque, prismatic crystals, or as a granular powder, exhaling an odor of sulphur dioxide, and having a disagreeable, sulphurous taste. Exposed to the air, the salt loses sulphur dioxide, and is gradually oxidized to sulphates. Soluble, at  $15^\circ \text{C}$ ., in 4 parts of water, and in 72 parts of alcohol. The aqueous solution gives an acid reaction.

It should be kept in a cool place, in small, well-stoppered bottles, filled as full as possible.

Prepared by passing sulphur dioxide through a solution of sodium carbonate (see Sodii Sulphis).

**Sodii Hyposulphis.** Sodium Hyposulphite. Sodium Thiosulphate.  $\text{Na}_2\text{S}_2\text{O}_3 + 5\text{H}_2\text{O}$ .

It occurs in colorless, transparent prisms, having a cooling, afterwards bitter taste. Efflorescent in dry air above the temperature of  $33^\circ \text{C}$ . ( $91.4^\circ \text{F}$ .). Soluble in 0.65 part of water at  $15^\circ \text{C}$ .; insoluble in alcohol. Its aqueous solution is neutral to litmus paper.

It should be kept in well-stoppered bottles. It is more stable than the sulphites, undergoing decomposition with acids less readily.

It may be obtained by digesting the solution of sodium sulphite, at a high temperature but short of ebullition, with finely-divided sulphur.

**ACTION.**

Sodium sulphite, bisulphite, and hyposulphite are decomposed by acids, and sulphur dioxide is a product of this decomposition. They have then the action of sulphurous acid, with the advantage of a more prolonged effect during the process of decomposition and elimination.

**USE.**

Externally, these may be used in solution, or ointment, (10 per cent.) in the treatment of parasitic skin diseases.

Internally they may be used in the treatment of some forms of dyspepsia.

**Φ ICHTHYOL.**  $\text{C}_{28}\text{H}_{36}\text{S}_3\text{O}_6(\text{NH}_4)_2$ .**Ammonium Ichthyol Sulphonate.**

This is the most important of the salts of ichthyo-sulphonic acid. Prepared from a bituminous mineral of Tyrol, which is rich in fossilized remains of fish and sea animals.

It has a peculiar, disagreeable odor, due to the presence of an inseparable volatile oil, and contains about 10 per cent. of sulphur combined in a manner not well understood. It is a clear, reddish-brown, viscid liquid, with a bituminous odor and taste. Miscible with water (the mix-

ture being faintly acid), and capable of combining in all proportions with fats and vaseline.

Dose : 0.12-0.60 Gm. gr. ij-x.

#### ACTION.

Ichthyol is a new drug of decided value. Its action depends upon (1) its reducing properties, (2) its antiseptic action, and (3) its vascular contractile effect. It is sedative, alterative, antiseptic, and parasiticide in action.

Internally it retards disintegration of albumins. It has a marked effect, especially when used both externally and internally, upon exudations. Pain is promptly relieved and the exudate is gradually absorbed. The peculiar properties of ichthyol are largely ascribed to the high proportion of sulphur that it contains.

Other salts of ichthyo-sulphonic acid are the ichthyo-sulphonates of sodium, lithium, zinc, and mercury. They all occur as brownish-black, tar-like masses, but the first is the only one of importance. Being solid, it is employed when we wish to give ichthyol in pill form.

#### USE.

Externally as an ointment (10 to 20 per cent., made with vaseline and lanolin) it is one of the best applications in the treatment of erysipelas, of local suppurative processes, of frost bites, of enlarged lymphatics, etc.; also in the treatment of various skin diseases, parasitic or non-parasitic. As a solution it may be used in certain inflammatory conditions of mucous membranes, but such solutions should be made with oil or with the liquid petroleum preparations, for in aqueous, alcoholic, or ethereal solutions, it has an acid reaction and is decidedly painful when applied to sensitive parts.

Internally it has no extensive therapeutic use, but it may be prescribed in some forms of chronic gastric catarrh, in some forms of nephritis, in chronic cystitis, chronic gonorrhœa, etc.

#### Φ THIOL.

Liquid thiol is a thin, brownish-black, neutral extract, with a feeble bituminous odor reminding of birch oil. Soluble in water, or glycerin; sparingly soluble in alcohol, or ether. Sp. gr.: 1.080-1.082.

When evaporated to dryness liquid thiol yields 40 per cent. of residue (thiolum siccum).

It is obtained by the action of sulphur on coal tar, and is a mixture of sulphureted hydro-carbons. It is practically an artificial ichthyol.

Dose, 0.06-0.30 Gm. gr. i-v.



## ACTION AND USE.

Supposed to be that of ichthyol. Whether it is as efficient as ichthyol has yet to be proven.

## Φ CHLORUM.

**Chlorine.**

A greenish yellow gas with a suffocating odor. It is non-respirable.

*Source.*—It may be obtained from hydrochloric acid, or from sodium chloride.

*General Action.*—Chlorine, and all of its preparations, acts as an antiseptic, and also as a bleacher. Its bleaching properties result from its decomposing water, removing its hydrogen, and setting free nascent oxygen which is the direct destroyer of organic matter. Its antiseptic properties, in part at least, are due to this same cause. It is very irritant in the undiluted form, whether respired or applied locally. It does not enter the system in the free state, but combines with bases or with albumin at the point of application, and is absorbed in this changed form. It has a narcotic action, paralyzing nerve centres, and it may cause death by paralyzing the respiratory centre; or through its irritant action, causing spasm of the glottis, or intense bronchitis. In poisoning by the inhalation of chlorine, the sufferer should cautiously inhale the fumes of ammonia, or a weak mixture of hydrogen sulphide in air.

## PREPARATIONS.

Aqua Chlorig	. . . . .	3.75-15.00 Cc	3i-iv.
Liquor Sodæ Chloratæ	. . . . .	1.90- 3.75 Cc.	3½-j.
Calx Chloratæ	. . . . .	0.18- 0.36 Gm.	gr. iij-vj.

**Aqua Chlorig.** Chlorine Water.

A greenish-yellow, clear liquid, having the suffocative odor, and disagreeable taste, of chlorine. It must contain at least 0.4 per cent. of the gas.

It must be kept in a dark, cool place, in amber-colored, glass-stoppered, completely filled, bottles.

Prepared by passing washed chlorine gas into water.

## ACTION.

That of chlorine.

## USE.

It may be used as an antiseptic mouth-wash (20 to 50 per cent. dilution), in stomatitis, aphtha, etc. By inhalation it may be used, combined with a saturated solution of salt, (equal parts), in the treatment of chronic bronchitis, chronic laryngitis, tuberculosis, etc.; 15 to 60 Cc. (3½-ij) of this mixture may be vaporized at each sitting, and there may be from one to three sittings daily.

**Liquor Sodæ Chloratæ.** Solution of Chlorinated Soda. Labarraque's Solution.

A clear, pale, greenish liquid, with a faint odor of chlorine, a disagreeable, alkaline taste, and an alkaline reaction. Sp. gr. : 1.052 at 15° C. It must be kept in well-stoppered bottles.

Prepared by decomposing chlorinated lime with sodium carbonate, or by passing chlorine into a solution of sodium carbonate. It contains chiefly sodium hypochlorite and chloride, with some carbonate.

#### ACTION.

That of chlorine. (See p. 145.)

#### USE.

As a disinfecting wash, or gargle (10 to 15 per cent. dilution).

**Calx Chlorata.** Chlorinated lime. Bleaching powder.

A compound resulting from the action of chlorine upon calcium hydrate, and containing not less than 35 per cent. of available chlorine. It is often improperly called "chloride of lime."

It is a white, or grayish-white, dry, or but slightly damp, powder, or friable lumps; exhaling the odor of hypochlorous acid; having a repulsive, saline taste; becoming moist, and gradually decomposing on exposure to air. It is sparingly soluble in water, or in alcohol.

On dissolving chlorinated lime in diluted hydrochloric acid, chlorine is given off. It must be kept in well-stoppered bottles.

#### ACTION.

That of chlorine. (See p. 145.)

#### USE.

It may be used for the disinfecting properties of chlorine in the disinfection of cesspools, water-closets, sick rooms, etc. A saturated solution may be used in the bed-pan that is to receive the stools from a typhoid fever, or tubercular, patient. It may be used to secure chlorine for inhalation in the treatment of chronic laryngitis, chronic bronchitis, tuberculosis, etc. 1.90 to 22.50 Gm. ( $3\frac{1}{2}$  in 6) of chlorinated lime is used in a room containing 550 cubic feet. The liberation of chlorine from chlorinated lime may be hastened by the addition of a small amount of hydrochloric acid.

#### BROMUM. Br.

**Bromine.**

It should be kept in a glass-stoppered bottle, in a cool place.

It is a heavy, dark, brownish-red, mobile liquid, evolving, even at ordinary temperatures, a yellowish-red vapor, highly irritant to the eyes

and lungs, and having a peculiar, suffocating odor, resembling that of chlorine. Soluble in 30 parts of water at 15° C.; readily soluble in alcohol, ether, chloroform, etc. It is completely volatilized by exposure to air, or heat. It renders gelatinized starch yellow. Sp. gr.: 2.990.

*Source*.—Found in sea water, and in saline springs.

*General Action*—Bromine, like chlorine, has an intense affinity for hydrogen, and so favors the oxidation of organic matter in the presence of moisture, by appropriating the hydrogen of the water and setting the oxygen free. It is thus a deodorant, and a disinfectant.

Pure bromine is a painful caustic. Weak solutions are antiseptic and stimulant. It enters the system as a bromide. All the compounds of bromine show a certain physiological action, due to the bromine they contain, called *bromism*. This is characterized by diminished reflex irritability, cerebral and spinal, or, in more marked cases, there is not only diminished reflex irritability, but also positive stupidity, failure of memory, motor and sensory weakness, and diminished, or abolished, sexual function. In still more marked bromism there may be total loss of conscious existence and the patient may die from paralysis of respiration, or of the heart. With bromism there is also a peculiar foetor to the breath; an cane-like eruption upon the face and upper part of the body; a muddy or bronzed complexion; a tendency to congestion, and even oedema, of the fauces, and of the conjunctiva.

The bromides are quickly absorbed, and elimination is rapid, chiefly through the kidneys, skin, and salivary glands. All the symptoms of bromism quickly disappear if the drug is discontinued, and, as a rule, no ill effects are left behind.

#### USE.

Bromine undiluted may be used as a caustic in hospital gangrene, etc. A weak solution ( $\frac{1}{2}$  per cent.) may be used as an antiseptic wash, or dressing. Bromine may also be used, if handled with great care, for deodorizing or disinfecting vaults, cesspools, hospital wards, etc.

#### PREPARATIONS.

##### Bromum.

Ammonii Bromidum . . . . .	0.60–3.75 Gm. gr. x–ʒi.
Calcii Bromidum . . . . .	0.60–3.75 Gm. gr. x–ʒi.
Lithii Bromidum . . . . .	0.60–3.75 Gm. gr. x–ʒi.
Potassii Bromidum . . . . .	0.60–3.75 Gm. gr. x–ʒi.
Sodii Bromidum . . . . .	0.60–3.75 Gm. gr. x–ʒi.
Strontii Bromidum . . . . .	0.60–3.75 Gm. gr. x–ʒi.
Zinci Bromidum . . . . .	0.03–0.12 Gm. gr. $\frac{1}{2}$ –ij.
Acidum Hydrobromicum Dilutum . .	1.90–7.50 Cc. ʒ $\frac{1}{2}$ –ij.

**POTASSII BROMIDUM. KBr.****Potassium Bromide.**

It should be kept in well-stoppered bottles.

It occurs in colorless, translucent, cubical crystals; permanent in dry air; odorless, having a pungent, saline taste, and a neutral reaction. Soluble, at 15° C., in 16 parts of water, and in 200 parts of absolute alcohol.

Prepared from potassa and bromine.

**ACTION.**

This is the most frequently used of the bromides. It has the physiological action peculiar to bromine. It has also the action of all potassium salts upon the circulation, slowing and weakening the heart's action, and diminishing the calibre of the small blood-vessels through vaso-motor spasm. The result of these actions in the circulation is partial capillary anæmia, and slight reduction of body temperature. Tissue waste is diminished also.

**USE.**

Potassium bromide is used alone, or in combination with the sodium and ammonium salts, in the treatment of epilepsy. It is also used in certain nervous conditions not dependent upon anæmia; in functional disturbances of the genital organs; in marked irritability of the pharynx or larynx, in order to facilitate examination of these parts; in spasmodic diseases,—whooping cough, infantile convulsions, puerperal convulsions, etc.

**SODII BROMIDUM. NaBr.****Sodium Bromide.**

It must be kept in well-stoppered bottles.

It occurs in small, white, or colorless crystals, or as a crystalline powder; permanent in dry air; odorless, having a saline, bitter taste, and a neutral or faintly alkaline reaction. Soluble, at 15° C., in 1.2 parts of water, and in 13 parts of alcohol.

Prepared from soda and bromine. It contains 77.62 per cent. of bromine, while the corresponding potassium salt contains but 67.13 per cent. bromine.

**ACTION.**

Sodium bromide is less unpleasant to the taste than the potassium salt, and, in every way, causes less functional derangement, but it is inferior in curative properties.

**USE.**

In a general way it may be stated that the sodium salt is used after the manner of the potassium salt.

**LITHII BROMIDUM. LiBr.****Lithium Bromide.**

It should be kept in well-stoppered bottles.

It is a white, granular salt ; odorless, having a sharp, somewhat bitter taste, and a neutral reaction. Very deliquescent ; soluble in 0.6 part of water ; very soluble in alcohol.

Prepared from lithium carbonate, and bromine ; or by first forming lithium sulphate, and adding to it a saturated solution of potassium bromide.

**ACTION.**

Lithium bromide contains more bromine than does any other of the alkaline bromides. It is claimed to be more speedily, and more powerfully, hypnotic than the other bromides. It closely resembles the potassium salt in general action.

**USE.**

The same as that of potassium bromide. It is seldom used.

**CALCII BROMIDUM. CaBr<sub>2</sub>.****Calcium Bromide.**

It should be kept in well-stoppered bottles.

A white, granular salt ; odorless, having a pungent, saline, bitter taste, and a neutral reaction. Very deliquescent. Soluble, at 15° C., in 0.7 part of water, and in 1 part of alcohol.

Prepared by first forming a sulphur bromide, by the action of sulphur on bromine, and then treating this with a solution of lime.

**ACTION.**

Calcium bromide has been recommended, because less irritating than the potassium salt, of which it is otherwise a duplicate.

**USE.**

The same as that of the potassium bromide. It is seldom used.

**AMMONII BROMIDUM. NH<sub>4</sub>Br.****Ammonium Bromide.**

It occurs in colorless, transparent, prismatic crystals, or as a white, granular salt, becoming yellow on exposure to air ; odorless, having a pungent, saline taste, and a neutral reaction. Soluble, at 15° C., in 1.5 parts of water, and in 30 parts of alcohol.

It may be prepared from ammonium sulphate by decomposing it with potassium bromide ; or by neutralizing hydrobromic acid with ammonia.



## ACTION.

Ammonium bromide is far more stimulating, and irritating than the potassium salt ; otherwise it is a duplicate in action.

## USE.

Whenever the bromides are to be used for a long time, as in epilepsy, a mixture of the potassium, sodium, and ammonium salts will often produce a more satisfactory result than can be secured from any one of them singly. The use of the ammonium salt is largely confined to such combinations.

**STRONTII BROMIDUM.**  $\text{StBr}_2 + 6\text{H}_2\text{O}$ .**Strontium Bromide.**

It should be kept in glass-stoppered vials.

It occurs as colorless, transparent crystals ; odorless, having a bitter, saline taste, and a neutral reaction. Very deliquescent. Soluble in 1.5 parts of water at  $15^\circ \text{C}$ .; very soluble in alcohol.

## ACTION.

This is a new salt that is considered by some to be superior to the potassium salt in many ways. Beside having the general action of the bromides it is said to act as an anti-fermentative ; to increase the appetite ; and to improve general nutrition. It has not a depressing action upon the heart.

## USE.

In epilepsy. In certain gastric affections attended by hyper-acidity. It is said to be of especial benefit in the gastric affections so often present with patients suffering from organic heart disease ; bright's disease ; etc.

**ZINCI BROMIDUM.**  $\text{ZnBr}_2$ .**Zinc Bromide.**

It should be kept in well-stoppered bottles.

A white, or nearly white, granular powder ; odorless, having a sharp, saline, and metallic taste, and a neutral reaction. Deliquescent. Very soluble, in water, and in alcohol. It may be prepared by the direct combination of zinc and bromine.

## ACTION.

Zinc bromide is irritant, and emetic, like other zinc salts. The action that is sought for in its medicinal use is the combined anti-spasmodic effect of zinc and bromine, but the possible dose gives an insignificantly small amount of bromine.

## USE.

There is no good reason for the use of this bromide therapeutically. It is seldom used.

## ACIDUM HYDROBROMICUM DILUTUM.

**Diluted Hydrobromic Acid.**

It is completely volatilized by heat and should be kept in glass-stoppered bottles protected from light.

A liquid composed of 10 per cent., by weight, of absolute hydrobromic acid (HBr), and 90 per cent. of water. It is colorless, odorless, having a strongly acid taste, and an acid reaction.

It may be prepared by passing sulphureted hydrogen into an aqueous solution of bromine. Two drachms contain about 12 grains of bromine, the equivalent of about 18 grains of potassium bromide.

## ACTION.

Diluted hydrobromic acid is almost identical with the potassium bromide in its action, without the depressing effect of the potassium salt, and with less tendency to cause bromism. It may also fulfill the properties of the dilute mineral acids, so far as their sour qualities are concerned. It is a good solvent for quinine, as it diminishes the tendency to cinchonism.

## USE.

Quite similar to that of the potassium bromide.

## IODUM. I.

**Iodine.**

It should be kept in glass-stoppered bottles in a cool place.

Iodine is a solid, bluish-black, non-metallic element.

It occurs in the form of dry rhombic plates, of a metallic lustre, a distinctive odor, a sharp and acrid taste, and a neutral reaction. It imparts a deep-brown stain to the skin and slowly destroys vegetable colors. It is sparingly soluble in water; soluble in 10 parts of alcohol at 15° C.; freely soluble in ether, or chloroform, or in the presence of iodides. It is slowly volatilized at ordinary temperature. With gelatinized starch, in a cold solution, it produces a dark-blue color.

*Source.*—Obtained from the ashes of sea-weed, and from mineral iodides, and iodates.

*General Action of Iodine.*—Iodine has not so great an affinity for hydrogen as has chlorine or bromine, and medically is more manageable. Locally, the vapor and weak solutions, are deodorant, and disinfectant; strong solutions are irritant, and caustic, causing tingling, prickling, or even severe pain. It stains the skin a yellowish-brown. The healing

action following the direct effect of iodine is rapid. It also is a parasiticide, though not to the same degree as are the mercurials. In the stomach it is apt to have an irritant action, disturbing digestion.

It is absorbed as an iodide (sodic), or as an albuminate, and gives the physiological action of the iodides. There is no good argument for the internal use of iodine preparations in preference to the iodides, where the constitutional action of the drug is wanted.

The iodides show a marked physiological action, due to the iodine they contain. It is possible that the constitutional action may be due largely to its affinity for hydrogen, thus setting free nascent oxygen, increasing oxidation of tissue, and acting as an alterative. The action at the point of elimination is due to a local irritation, mild or severe, according to the amount of elimination that is taking place. Elimination is chiefly through the kidneys, the skin, and salivary glands; also through the nasal, bronchial, and intestinal, mucous membrane.

**Iodism** is characterized by a general feeling of discomfort, preceding feverishness, watery discharge from the eyes and nose, together with congestion of the conjunctiva and nasal mucous membrane; hoarseness and difficult breathing, due to irritation and congestion of the mucous membrane lining the air passages; epigastric pain, nausea, vomiting, diarrhoea, and colic, due to irritation of the gastro-intestinal mucous membrane; an acne-like eruption, generally appearing in the following order—on the face, the body, and the extremities (sometimes this eruption is eczematous rather than acne-form); nervous symptoms, such as listlessness and depression. These symptoms are largely due to the iodine set free from its compounds during elimination.

Outside of the symptoms of iodism are the physiological effects that we seek for in prescribing the iodides. These favor retrograde metamorphosis of the products of various morbid processes, inflammatory or hyperplastic. This influence is most marked when the parts involved belong to the nervous, or to the connective tissue structures, especially when the morbid process is due to syphilis, or to rheumatism.

Iodine set free in the system may combine with such metals as arsenic, lead, mercury, etc., which may have become deposited in the tissues, forming soluble iodides which are readily eliminated through the usual channels.

#### PREPARATIONS.

Tinctura Iodi . . . . .	o.12–0.30 Cc.	℥ ij–v.
Φ Tinctura Iodi Composita . . . . .	For external use.	
Liquor Iodi Compositus . . . . .	o.12–0.30 Cc.	℥ ij–v.
Unguentum Iodi . . . . .	For external use.	
Ammonii Iodidum . . . . .	o.18–0.30 Gm.	gr. iij–v.

Potassii Iodidum . . . . .	0.30-3.75 Gm. gr. v- $\text{z}\text{i}$ .
Unguentum Potassii Iodidi . . .	For external use.
Sodii Iodidum . . . . .	0.30-3.75 Gm. gr. v- $\text{z}\text{i}$ .
Strontii Iodidum . . . . .	0.30-1.90 Gm. gr. v-xxx.
Syrupus Acidi Hydriodici . . . .	0.60-3.75 Cc. $\text{M}$ x- $\text{z}\text{i}$ .
Zinci Iodidum . . . . .	0.03-0.12 Gm. gr. $\frac{1}{2}$ -ij.
Argentii Iodidum . . . . .	See Argentum.
Arseni Iodidum . . . . .	See Arsenum.
Plumbi Iodidum . . . . .	See Plumbum.
Sulphuris Iodidum . . . . .	See Sulphur.

**Tinctura Iodi.** Tincture of Iodine is prepared from iodine 70 Gm. alcohol to 1000 Cc. It should be kept in well-stoppered bottles. (A 7 per cent. tincture.)

**Tinctura Iodi Composita.** Compound Tincture of Iodine. (Churchill's Tincture.) Prepared from iodine  $\text{z}\text{v}$ , potassium iodide  $\text{z}\text{i}$ , water  $\text{z}\text{i}$ , alcohol  $\text{z}\text{iij}$  (twice the strength of the official tincture). (A 15 per cent. tincture.)

#### USE.

These tinctures are used externally for their irritant, local alterative, antiseptic, or parasiticide action; and by injection into serous cavities for their irritant action. Internally the preparations of iodine are inferior to the iodides, and are seldom used. They may be used by inhalation for the stimulating action of iodine in the treatment of chronic diseases of the respiratory tract.

**Unguentum Iodi.** Iodine Ointment. Prepared from iodine 4 parts, potassium iodide 1 part, benzonated lard to 100 parts.

#### USE.

The ointment is used for the irritant effect of iodine, and also for its local alterative action at the point of absorption. It should always be freshly prepared.

**Liquor Iodi Compositus.** Compound Solution of Iodine. (Lugol's solution.) Prepared from iodine 5 parts, potassium iodide 10 parts, water to 100. It must be kept in well-stoppered bottles.

#### USE.

This liquor may be used internally instead of the iodides, but there is no good reason for so doing.

### POTASSII IODIDUM. KI.

#### Potassium Iodide.

It should be kept in well-stoppered bottles.

It occurs in colorless, translucent, cubical crystals, having a peculiar, faint odor, a pungent, saline, bitter taste, and a neutral reaction. Deli-

quescent. Soluble, at  $15^{\circ}\text{C}$ ., in 0.75 part of water, and in 18 parts of alcohol. The commercial salt generally appears in white, opaque crystals, having a faintly alkaline reaction.

Prepared from a solution of potassa and iodine.

### **Unguentum Potassii Iodidi.** Ointment of Potassium Iodide.

It contains 12 per cent. of potassium iodide in benzoated lard.

#### **ACTION.**

Potassium iodide is less irritating than iodine, and, perhaps, more quickly absorbed. It has the general action of the potassium salts in addition to the iodine action, that is wanted. It is the most frequently prescribed of the iodine preparations.

It forms soluble salts with metals that may be present in the tissues, and thus hastens their elimination.

#### **USE.**

Potassium iodide is used for its alterative action in syphilis; in some forms of subacute or chronic rheumatism; in certain chronic inflammations of serous, or mucous membranes, etc. It may be used for its chemical action after absorption in the treatment of chronic poisoning from mercury, lead, zinc, arsenic, etc. The beneficial action resulting from the use of this salt in secondary and tertiary syphilis when its administration has been preceded by a course of mercurial treatment is due in part, at least, to the setting free of mercury that has been stored up in the tissues.

### **SODII IODIDUM. NaI.**

#### **Sodium Iodide.**

It should be kept in well-stoppered bottles.

It occurs in minute, white, or colorless crystals, or as a crystalline powder; odorless, having a saline, and slightly bitter taste, and a neutral, or faintly alkaline reaction. Deliquescent on exposure to air. Soluble, at  $15^{\circ}\text{C}$ ., in 0.6 part of water, and in 3 parts of alcohol.

Prepared from a solution of soda and iodine.

#### **ACTION.**

Sodium iodide has about the same physiological action as has the potassium salt, except that it is less depressing, less irritating, less diuretic, and also less certain to produce the desired physiological action of the iodides.

#### **USE.**

This salt is preferred by some, on theoretical grounds, to the potassium salt. When used it is, however, in the same class of cases in which the potassium salt is applicable. It is generally conceded to be inferior to the potassium salt, therapeutically.



**AMMONII IODIDUM.  $\text{NH}_4\text{I}$ .****Ammonium Iodide.**

It should be kept in well-stoppered bottles and protected from the light.

It occurs as a white, granular salt, or as minute crystalline cubes, soon becoming yellow, or yellowish-brown on exposure to air; odorless when white, but emitting a slight odor of iodine when discolored; having a sharp saline taste, and a neutral reaction. Very deliquescent. Soluble, at  $15^\circ \text{C}$ ., in 1 part of water, and in 9 parts of alcohol.

It may be prepared through a double decomposition between ammonium sulphate and potassium iodide.

**ACTION.**

Ammonium iodide is less depressing, more irritating, and less certain than the potassium iodide.

**USE.**

It is seldom used.

**STRONTII IODIDUM.  $\text{SrI}_2 + 6\text{H}_2\text{O}$ .****Strontium Iodide.**

It should be kept in dark amber-colored, glass-stoppered vials.

It occurs as colorless, transparent plates; odorless, having a bitterish saline taste, and a neutral, or very slightly acid reaction. Deliquescent; colored yellow by exposure to air, and light. Soluble in 0.6 part of water at  $15^\circ \text{C}$ . Soluble in alcohol, and slightly soluble in ether.

**ACTION.**

Strontium iodide has the general action of potassium iodide, but is less depressing.

**USE.**

After the manner of potassium iodide.

**ZINCI IODIDUM.  $\text{ZnI}_2$ .****Zinc Iodide.**

It must be kept in small, glass-stoppered bottles.

It is a white, or nearly white, granular powder; odorless, having a sharp, saline, metallic taste, and an acid reaction. Very deliquescent. Soluble in water, and in alcohol.

Prepared from zinc and iodine.

**ACTION.**

This salt is supposed to have the combined action of zinc and iodine, but the dose is necessarily so small that the iodine action is quite limited.

**USE.**

It is seldom used.

## SYRUPUS ACIDI HYDRIODICI.

**Syrup of Hydriodic Acid.**

A transparent, colorless, or pale straw-colored, syrupy liquid, containing 1 per cent. of absolute hydriodic acid (HI); odorless, having a sweet, and acidulous taste, and an acid reaction.

Obtained from a solution of iodine in alcohol, syrup, and water, by passing through this mixture a current of hydrosulphuric acid gas. It is very unstable.

## ACTION.

Syrup of hydriodic acid has the general action of the so-called mineral acids. It also has the action of the alkaline iodides because of the iodine in its composition, and it is for this action that it is generally used.

## USE.

This preparation is sometimes used instead of the commonly prescribed iodides when the action of the iodides is wanted.

## PART V.

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### THE CARBON COMPOUNDS.

“Carbon compounds are remarkable, as a class, for a degree of complexity of constitution far exceeding that observed in any of the compounds previously described. And yet the number of elements which enter into their composition is extremely limited. Very few contain more than four, viz., carbon, hydrogen, oxygen and nitrogen. This paucity of elementary bodies is compensated by the peculiar and extraordinary properties of combinations that these four possess. There appears to be absolutely no limit to the number of definite substances which can be formed, each marked by a perfect individuality of its own.”

#### COAL TAR.

“When bituminous coal is subjected to dry distillation, besides the incondensable gases which serve for lighting, and the charcoal, left behind as coke, which is a valuable fuel, there are formed, through the reactions of the disengaged principles of the coal, numerous other products, necessarily more or less varying in character and amount, not only according to the kind of coal used, but also with the varying circumstances of the decomposing process. Most of these newly-formed bodies, all of which are volatile, are condensed into a dark, thick liquid, or semi-liquid substance, called coal tar. Formerly this was considered as refuse matter, and the most embarrassing problem for the manufacturer was how to get rid of it most conveniently. But science and industry have combined to wrest from this seemingly useless mass many substances of great value in the arts, and several which have entered into the catalogue of remedies. The composition of coal tar varies considerably with the temperature at which the distillation of the coal is effected, the yield of solid bodies and of gases being larger when the temperature is higher, while at a lower temperature the liquid portion of the tar is increased in amount. When coal tar is submitted to distillation and rectification it yields the following products in variable proportion. They may be arranged in three divisions of solids, liquids and gases:

1. *Solids*.—Naphthalene  $C_{10}H_8$ , methyl-naphthalene  $C_{11}H_{10}$ , acetyl-naphthalene, and diphenyl  $C_{12}H_{10}$ , fluorene  $C_{13}H_{10}$ , anthracene and phen-

anthrene  $C_{14}H_{10}$ , fluoranthene  $C_{15}H_{10}$ , methyl-anthracene  $C_{15}H_{12}$ , retene  $C_{16}H_{12}$ , chrysene  $C_{18}H_{12}$ , pyrene  $C_{16}H_{10}$ , and carbazol  $C_{16}H_{11}N$ .

2. *Liquids*.—These may be neutral hydrocarbons, acids and ethers of the same, or bases. The *neutral hydrocarbons* are benzol  $C_6H_6$ , toluol  $C_7H_8$ , methyl-toluol and iso-xytol  $C_8H_{10}$ , pseudocumol, and mesitylene  $C_9H_{12}$ , cymol  $C_{10}H_{14}$ . The *acid constituents* are phenol  $C_6H_6O$ , orthocresol, paracresol and metacresol  $C_7H_8O$ , phlorol  $C_8H_{10}O$ , rosolic acid  $C_{20}H_{16}O_3$ , pyrocatechin  $C_6H_6O_2$ , and creosote, consisting of the methyl ethers of pyrocatechin and its homologues  $C_7H_8O_2$ ,  $C_8H_{10}O_2$ ,  $C_9H_{12}O_2$ . There are also present, probably in combination with the ammonia of the ammoniacal liquor, acetic, butyric, carbonic, hydrocyanic, sulphocyanic, and hydrosulphuric acids. The *bases* are ammonia,  $NH_3$ , methylamine  $CH_3NH_2$ , ethylamine  $C_2H_5NH_2$ , phenylamine  $C_6H_5NH_2$ , pyridine  $C_5H_5N$ , picoline  $C_6H_7N$ , lutidine  $C_7H_9N$ , collidine  $C_8H_{11}N$ , leukoline  $C_9H_{11}N$ , iridoline  $C_{10}H_9N$ , kryptidine  $C_{11}H_{11}N$ , acridine  $C_{12}H_9N$ , coridine  $C_{10}H_{15}N$ , rubidine  $C_{11}H_{17}N$  and viridine  $C_{12}H_{19}N$ .

3. *Gases*.—These may be divided into illuminating gases, heating and diluting gases, and impurities. *Illuminating gases*. Acetylene  $C_2H_2$ , ethylene  $C_2H_4$ , propylene  $C_3H_6$ , butylene  $C_4H_8$ , allylene  $C_3H_4$ , crotonylene  $C_4H_6$ , terene  $C_5H_8$ , and vapors of benzol  $C_6H_6$ , styrolene  $C_8H_8$ , naphthalene  $C_{10}H_8$ , methyl-naphthalene  $C_{11}H_{10}$ , fluorene  $C_{13}H_{10}$ , fluoranthene  $C_{15}H_{10}$ , hexane  $C_6H_{14}$ , heptane  $C_7H_{16}$ , octane  $C_8H_{18}$ . *Heating and diluting gases*. Hydrogen  $H_2$ , marsh-gas (methane),  $CH_4$ , carbon-monoxide,  $CO$ . *Impurities*. Carbon dioxide  $CO_2$ , ammonia  $NH_3$ , cyanogen  $(CN)_2$ , methylcyanide  $CH_3CN$ , sulphocyanic acid  $HCNS$ , hydrogen sulphide  $H_2S$ , carbon disulphide  $CS_2$ , carbon oxysulphide  $COS$ , and nitrogen  $N_2$ .—U. S. D. 16th Edition.

### BENZINUM.

**Petroleum Benzin.** Petroleum Ether.

A purified distillate from American Petroleum consisting of hydrocarbons, chiefly of the marsh gas series ( $C_5H_{12}$ ,  $C_6H_{14}$ ), and homologous compounds. It should be carefully kept in well-stoppered bottles, or tin cans, in a cool place, remote from lights or fire.

It is a transparent, colorless, diffusive liquid, of a strong, characteristic odor, slightly resembling that of petroleum, but much less disagreeable; neutral in reaction. Insoluble in water; soluble in about 6 parts of alcohol, and readily so in ether, chloroform, fixed and volatile oils. Sp. gr., 0.670-0.675 at  $15^\circ C$ . It is highly inflammable, and its vapor, when mixed with air and ignited, explodes violently.

Dose: 0.30-0.95 Cc.  $\mathcal{M}$ v-xv.

### ACTION.

Benzin has the action of an antiseptic, a sedative, a local anæsthetic, a rubefacient, and a parasiticide. It is also toxic. An overdose, by

inhalation, or internal administration, will produce sometimes only an intoxication like that from alcohol; sometimes convulsions, coma and death.

#### USE.

It may be used as a local anæsthetic, as a rubefacient, or as a parasiticide. Internally it may be used to prevent gastric fermentation. By inhalation it may be used in whooping-cough. It may be used pharmaceutically instead of ether as a solvent for fats, resins, etc.

#### Φ RHIGOLENE.

##### Amyl Hydride.

This is a name given to the lighter distillates from petroleum, namely, those which boil at a temperature of about  $18^{\circ}\text{C}$ . ( $65^{\circ}\text{F}$ ). It is most inflammable, and the highly diffusible vapor, when mixed with atmospheric air, is exceedingly explosive. It should be kept in strong bottles, securely corked, and in a cool place.

#### ACTION.

That of a local anæsthetic, and refrigerant.

#### USE.

As a spray it may be used as a local anæsthetic, but care must be taken not to continue its application too long, lest it cause sloughing of the part.

Rhigolene is not in general use, on account probably of its dangerous character.

#### Φ PETROLATUM.

A mixture of the hydrocarbons, chiefly of the marsh gas series. Obtained by distilling off the lighter and more volatile portions from petroleum until the residue has reached the desired consistence. It is then purified by filtration through bone-black.

#### PREPARATIONS.

Petrolatum Liquidum . . . . .	For external use.
Petrolatum Molle . . . . .	For external use.
Petrolatum Spissum . . . . .	For external use.

#### PETROLATUM LIQUIDUM.

##### Liquid Petrolatum. Liquid Paraffin.

A colorless, or more or less yellowish, oily, transparent liquid; without odor, or taste, or giving off when heated, a faint odor of petroleum. Sp. gr., 0.875 to 0.945 at  $15^{\circ}\text{C}$ . Insoluble in water; scarcely soluble in alcohol.



**PETROLATUM MOLLE.**

**Soft Petrolatum.** Soft Paraffin. Paraffin Jelly. Vaseline, Cosmoline, Abolene.

A fat-like mass of about the consistence of an ointment, varying from white to yellowish, or yellow, transparent in thin layers, completely amorphous; without odor or taste, or giving off when heated a faint odor of petroleum. If a portion of soft petrolatum be liquefied, and brought to a temperature of  $60^{\circ}$  C. ( $140^{\circ}$  F.), it will have a sp. gr. of about 0.820 to 0.840. The melting point for soft petrolatum ranges between  $40^{\circ}$  and  $45^{\circ}$  C. ( $104^{\circ}$  and  $113^{\circ}$  F.). When petrolatum is ordered, without further specification, soft petrolatum is to be dispensed.

**PETROLATUM SPISSUM.**

**Hard Petrolatum.**

A fat-like mass of about the consistence of a cerate. Its melting point ranges between  $45^{\circ}$  and  $51^{\circ}$  C. ( $113^{\circ}$  and  $125^{\circ}$  F.). In other respects hard petrolatum has the characteristics of liquid petrolatum.

**ACTION.**

All of the preparations of petrolatum act as bland protectants.

**USE.**

These preparations may be used as a basis for sprays, ointments, etc., when protection of a part is wanted.

**GLYCERINUM.**

**Glycerin.**

A liquid obtained by the decomposition of vegetable or animal fats, or fixed oils, and containing not less than 95 per cent. of absolute glycerin [ $C_3H_5(OH)_3$ ], a triatomic alcohol.

It is a clear, colorless liquid, of a thick, syrupy consistence, oily to the touch; odorless, very sweet and slightly warm to the taste. Sp. gr. not less than 1.250 at  $15^{\circ}$  C. When exposed to the air it slowly abstracts moisture. Soluble in all proportions, in water or alcohol. An aqueous solution has a neutral reaction.

Glycerin is produced during the manufacture of soap, the potassa or soda uniting with the fatty acids and setting the glycerin free.

It is also produced by decomposing fats with high pressure steam, in the presence of a small quantity of zinc oxide.

Or, again, subjecting fatty bodies to the action of water at a high temperature, under pressure, whereby the fats, which are glycerides, or ethers of the fatty acids, are broken up into free glycerin and free fatty acids, the water supplying the hydrogen and oxygen necessary for that change.

## ACTION.

Glycerin is emollient and protectant when diluted; slightly irritant in the undiluted state; depletant when applied to a congested mucous surface. Much of its local action is due to its hygroscopic properties. Taken internally, or used per rectum, glycerin acts as a mild laxative. This action is due to its irritant and hygroscopic properties. In the liver it inhibits the formation of sugar. It has slight nutritive properties. It is also mildly antiseptic.

## PREPARATIONS.

Glycerinum . . . . .	0.60-3.75 Cc. $\mathfrak{M}\times\text{-}\mathfrak{z}\mathfrak{i}$ .
Suppositoria Glycerini . . . . .	$\mathfrak{I} = 6$ Gm. (about $3\mathfrak{I}\frac{1}{2}$ ).
Glyceritum Acidi Carbolici . . . . .	(20 per cent. acid).
Glyceritum Acidi Tannici . . . . .	(20 per cent. acid).
Glyceritum Boroglycerini . . . . .	(31 per cent. boric acid).
Glyceritum Amyli . . . . .	(10 per cent. starch).
Glyceritum Hydrastis . . . . .	(50 per cent. hydrastis).
Glyceritum Vitelli . . . . .	(45 per cent. yolk).

## USE.

Glycerin diluted with water, or alcohol, may be used as a local protectant in certain forms of skin disease. It may be used diluted (25 per cent.) as a mouth wash in typhoid, and other forms of fever; also in the treatment of mouth affections for its own action, and to prolong the local effect of such drugs as may be prescribed with it. It is used extensively in gynæcological practice for its hygroscopic properties. Its hygroscopic properties make it useful in chronic constipation; used as an enema, or as a suppository, a soft moist stool should follow within half an hour's time. It may be used for its antiseptic action to prevent gastric fermentation. It may be used instead of sugar as a sweetening agent during the existence of glycosuria.

Pharmaceutically glycerin has an extensive use as a vehicle and solvent; also as a means of keeping extracts, etc., moist.

ALCOHOL ABSOLUTUM.  $\text{C}_2\text{H}_5\text{OH}$ .**Absolute Alcohol.**

Ethyl alcohol, containing not more than 1 per cent., by weight, of water.

It should be kept in well-stoppered bottles, or in cans, in a cool place, remote from lights or fire.

A transparent, colorless, mobile and volatile liquid, of a characteristic, rather agreeable odor, and a burning taste. Very hygroscopic.

It is obtained from vegetable juices, and infusions containing sugar,

by vinous or alcoholic fermentation and distillation. The sugar  $C_6H_{12}O_6$ , yields by fermentation,  $2C_2H_5OH$ (alcohol) +  $2CO_2$  (carbon dioxide).

#### ACTION.

Alcohol precipitates albumin, by withdrawing water from it, and thus tends to harden tissue. Applied to the skin evaporation takes place readily and produces a sensation of cold. If evaporation is prevented, it acts as a mild irritant, causing an increased supply of blood to the part, and a sensation of warmth or burning. On mucous membrane it has a similar action, the precipitation of albumin now having a mild, astringent effect, while the influence on the local circulation is more marked through paralysis of the vaso-constrictor centres, causing congestion and a sensation of warmth, with increased secretion. Alcohol is aseptic, but not antiseptic, in action.

Absorption of alcohol (sufficiently diluted) from the stomach takes place rapidly. In the blood it diminishes the oxygen-carrying power of the corpuscles. In the tissues it appropriates oxygen, thus lessening oxidation of tissue and consequent elimination of tissue waste, and favoring the accumulation of waste materials in the tissues in the form of fat. The alcohol itself is oxidized, like any other carbohydrate, into carbon dioxide and water, and supplies force.

Alcohol has a double action upon the nervous system. First, by increasing the circulation through the nerve centres it may stimulate their functional activity for the time being; its secondary action is sedative or paralyzing, affecting the nerve centres in the inverse order of their development—the highest centres first, the lowest last.

Alcohol affects the circulation; first, by increasing the force and frequency of the heart's action; second, by causing dilatation of the peripheral blood-vessels. Its action upon the circulation is not thoroughly understood, but it is probably both centric and peripheral. As a result of the dilated peripheral blood-vessels, the body surface becomes flushed and warm; the blood passes more rapidly from the arteries to the veins, and does not so completely lose its arterial character as it would under normal conditions; the veins are therefore distended, and of a lighter blue than usual.

Four factors enter into the lowering of temperature which accompanies the use of alcohol. (1) Diminished oxidation; this only comes when large doses have been used. (2) Increased radiation, due to the dilated condition of the peripheral vessels. (3) Increased secretion of sweat, attended by increased evaporation. (4) Increased expenditure of heat in warming the increased excreta by the lungs, skin, and kidneys.

Digestion is influenced favorably by small quantities of alcohol, for it increases the supply of blood to the gastric mucous membrane and thus

increases the secretion of gastric juice ; at the same time it excites a desire for food. Large single, or continued doses, are harmful ; the first retards digestion ; the second, by constant stimulation, gives rise to an abnormal gastric secretion which greatly interferes with digestion.

Glandular secretion, generally, is increased, the result of an increased supply of blood to the glands. A long-continued increase of blood supply to the glands leads, in time, to the development of pathological changes in the glands.

Elimination of alcohol takes place through the lungs, skin, kidneys, and intestines. A moderate amount may be so thoroughly oxidized in the tissues that very little of the quantity ingested will escape through the channels of elimination already indicated.

### TOXICOLOGY.

Large doses of alcohol may cause sudden death by heart failure, through reflex action ; or by paralysis of the cardiac, or of the respiratory centre.

*Treatment.*—The use of cardiac or respiratory stimulants, such as strychnine, electricity, artificial heat, etc.

### PREPARATIONS.

NAME.	PERCENTAGE OF ALCOHOL.		SP. GR. AT 15° C.	DOSE.	
	<i>By Wght.</i>	<i>By Volume.</i>		Cc.	
Alcohol Absolutum . . .	99.		0.797	Pharmaceutical Use.	
Alcohol Deodoratum . . .	92.5	95.1	0.816	" "	
Alcohol . . . . .	91.	94.	0.820	7.50—15.00	ij—iv
Alcohol Dilutum . . . .	41.	48.6	0.936	15.00—30.00	$\frac{1}{2}$ — $3\frac{1}{2}$
Spiritus Frumenti . . . .	44 to 50	50 to 58	0.930—0.917	15.00—30.00	$\frac{1}{2}$ —j
Spiritus Juniperi Compositus	68.7	70.		15.00—30.00	$\frac{1}{2}$ —j
Spiritus Vini Gallici . . .	39 to 47	46 to 55	0.941—0.925	15.00—30.00	$\frac{1}{2}$ —j
Vinum Album . . . . .	10 to 14	12.4 to 17.3	0.990—1.010	60.00—120.00	ij—iv
Vinum Rubrum . . . . .	10 to 14	12.4 to 17.3	0.989—1.010	60.00—120.00	ij—iv

### Alcohol Dilutum. Diluted Alcohol.

A liquid composed of about 41 per cent. by weight, or about 48.6 per cent., by volume, of absolute ethyl alcohol, and about 59 per cent. by weight, or about 51.4 per cent., by volume, of water. It should be kept in well-closed vessels, in a cool place, remote from lights or fire.

### ACTION.

The action is described fully under alcohol. See p. 162.

## USE.

Alcohol may be used externally as a stimulating and astringent wash to prevent the formation of bed-sores. In fevers it may be used as a sponge bath. It reduces the temperature in these cases by favoring evaporation; at the same time it increases the general comfort of the patient through its sedative action. It may be used as a local dressing for sprains, burns, etc., for its local sedative action. It may be used to arrest the oozing of capillary hæmorrhage.

In regulating the dose for internal use of the various alcoholic stimulants, the physical condition of the patient and the result to be acquired must be taken into consideration. A healthy adult can assimilate about two ounces of *absolute alcohol* in twenty-four hours without causing disturbance of digestion, or other injurious consequences. In certain diseased conditions, however, the patient may far exceed the normal limit without injury.

The taste of alcohol is less objectionable to children, as a rule, than is that of the spirits, and wines, and for this, or other reasons, it may be prescribed internally, where alcoholic stimulants are indicated to overcome heart failure;—as in diphtheria, typhoid fever, pneumonia; poisoning from certain drugs; poisoning from the bite of venomous insects, or serpents; or in shock due to injury, or surgical operation. In febrile conditions—notably typhoid fever—it may be used, not only for its stimulating properties, but also for its sedative action, and its power to diminish oxidation. It may be used to aid digestion in certain cases of debility, due to age, or disease. Its sedative action may be utilized in the treatment of some forms of insomnia.

The danger of the patient acquiring the alcoholic “habit,” as a result of its therapeutic use, should always be kept in mind by the prescriber. This is especially true when alcohol is used in the treatment of chronic, or nervous diseases.

**Spiritus Frumenti.** Whiskey.

An alcoholic liquid obtained by the distillation of the mash of fermented grain (usually of mixtures of corn, wheat, and rye), and at least two years old. It is amber-colored, having a distinctive odor and taste, and a slightly acid reaction.

## ACTION AND USE.

That of alcohol. See p. 162.

**Spiritus Vini Gallici.** Brandy.

An alcoholic liquid obtained by the distillation of the fermented, unmodified juice of fresh grapes, and at least four years old. A pale, amber-



colored liquid, having a distinctive odor and taste, and a slightly acid reaction.

#### ACTION AND USE.

That of alcohol. See p. 162. Whiskey and brandy are the most generally used of the alcoholic stimulants. Whiskey has been used more than brandy, in years gone by, because genuine brandy was not easily secured. At present this objection to brandy should not exist. In general, it may be stated that whiskey is less palatable than brandy, and it is more apt to produce functional disturbance of the stomach. In the absence of pure brandy, whiskey is the best of the alcoholic distilled liquors.

**Spiritus Juniperi Compositus.** A substitute for gin.

An alcoholic preparation to which the oils of juniper, caraway and fennel have been added in fixed proportions (oil of juniper, 8 Cc. ; oil of caraway, 1 Cc. ; oil of fennel, 1 Cc. ; alcohol, 1400 Cc. ; water to 2000 Cc.).

#### ACTION.

In addition to the stimulating effect produced by the alcoholic preparations, the compound spirit of juniper has a diuretic action, dependent upon the oil of juniper present in its composition.

#### USE.

It may be used as a diuretic, carminative, and antispasmodic alcoholic stimulant.

**Vinum Album.** White Wine.

An alcoholic liquid, made by fermenting the juice of fresh grapes, freed from seeds, stems, and skins.

It is a pale, amber-colored, or straw-colored liquid, having a pleasant odor free from yeastiness, and a fruity, agreeable, slightly spirituous taste, without excessive sweetness or acidity.

When white wine is prescribed, without further specification, it is recommended that a dry white wine of domestic production (such as California Riesling, Ohio Catawba, etc.), be employed.

White wine should be preserved in well-closed casks filled as full as possible, or in well-stoppered bottles, in a cool place.

**Vinum Rubrum.** Red Wine. /

An alcoholic liquid, made by fermenting the juice of fresh, colored grapes, in presence of their skins.

A deep, red liquid, having a pleasant odor free from yeastiness, and a fruity, moderately astringent, pleasant and slightly acidulous taste, without excessive sweetness or acidity. It contains some tannin.

When red wine is prescribed, without further specification, it is recom-

mended that a dry red wine of domestic production (such as a native Claret, Burgundy, etc.), be employed.

Red wine should be preserved in well-closed casks filled as full as possible, or in well-stoppered bottles, in a cool place.

#### ACTION AND USE.

These wines owe their action to the alcohol which they contain, and are used accordingly. The red wines contain more tannin than the white wines, and are consequently more astringent.

#### OTHER ALCOHOLIC PREPARATIONS. Not Official.

##### **Champagne.**

This is an effervescent, or so-called sparkling wine, obtained by fermentation from grapes. The effervescence is due to arrested, or incomplete, fermentation. Alcoholic strength, by volume, 6 to 13 per cent.

Dose: 15.00–60.00 Cc.  $\frac{3}{4}$ –ij.

#### ACTION.

Champagne produces a more marked stimulant action than an equal quantity of a “still” wine of similar alcoholic strength.

#### USE.

This wine is particularly useful when alcoholic stimulants are indicated, but when an irritable condition of the stomach prevents the administration of the more common wines.

For therapeutic use champagne should be as free from sugar as possible—an extra dry wine.

##### **Beer.**

This is a fermented infusion of malt, flavored with hops. Alcoholic strength (by volume) 1 to 5 per cent.

##### **Ale.**

This is also a fermented infusion of malt, made by a more rapid process, and at a higher temperature than that employed for beer. It has, as a rule, a higher alcoholic strength (3 to 8 per cent. by volume) than beer.

##### **Porter.**

This resembles the other malt liquors. It derives its color from malt that has been dried at a still higher temperature. Its alcoholic strength (by volume) is 3 to 5 per cent.

##### **Stout.**

This constitutes a beverage of the same nature as porter. It contains a large amount of extractive matter.

*General Action of Fermented Liquors.*—These fermented liquors contain water, alcohol, sugar, dextrine and allied substances, nitrogenous matter, traces of fatty matter, aromatic, bitter, and coloring principles, saline matter, with variable quantities of carbonic, and acetic acids. The alcohol, sugar and its allies, and the bitter principles are the constituents that give these liquors their characteristic properties, namely;—their stimulating, nutritive, and tonic properties.

#### USE.

The lighter ales and beer may be used as stomachic tonics, or to aid digestion, in certain conditions of debility. Porter or stout are of value in wasting diseases, in convalescence from acute diseases, and for nursing women.

#### Liquid Malt Extracts.

There are many of these on the market. They are quite generally understood, by the laity, to be *non-alcoholic* malt preparations. This is not true of the best productions. They contain from 3 to 7 per cent. (by volume) of alcohol. It is hard to understand what advantages these preparations can have over the so-called fermented liquors, unless the fact that over-scrupulous individuals may thus unknowingly be persuaded to use such a liquor when desirable, can be so considered.

#### CHLOROFORMUM. $\text{CHCl}_3$ .

**Chloroform.** Trichlormethane.

A liquid consisting of 99 to 99.4 per cent., by weight, of absolute chloroform, and 1 to 0.6 per cent. of alcohol.

It should be kept in dark, amber-colored, glass-stoppered bottles, in a cool and dark place.

A heavy, clear, colorless, mobile, and diffusible liquid, of a characteristic, ethereal odor, and a burning, sweet taste. Soluble in 200 times its volume of cold water, and in all proportions of alcohol, ether, etc. Sp. gr. : not below 1.490 at 15° C. (59° F.) or 1.473 at 25° C. (77° F.) It is volatile even at a low temperature, and boils at 60° to 61° C. (140° to 141.8° F.) It is not inflammable, but its heated vapor burns with a green flame.

The vapor, when generated in the presence of gas or lamp flame, develops chlorine and phosgen gas ( $\text{COCl}_2$ ). These are irritant, and non-respirable.

Prepared by distilling alcohol with chlorinated lime; or by decomposing chloral hydrate with alkalies; or by distilling acetone with chlorinated lime.

#### ACTION.

Applied locally it is anodyne in action when used in small quantity, or properly diluted; irritant, if used undiluted, causing pain, followed by

numbness, and local anæsthesia. Blistering may occur if evaporation is prevented.

It has antiseptic properties, and will arrest fermentation. It is also a parasiticide.

Internally its first action is that of an antiseptic, and gastric stimulant, or irritant, according to the amount swallowed.

If there is excessive flatulence or colic it causes expulsion of flatus by increasing peristalsis, and at the same time has a local narcotic influence, quieting pain and spasm. The constitutional symptoms, produced by an internal dose of 3.75 to 7.50 Cc. (ʒi to ʒij), are similar to those produced by inhalation of the drug, the narcotism, however, developing and passing off more slowly.

Inhalation produces general anæsthesia, with a train of symptoms which, for convenience, may be divided into four stages.

(1) Stage of Stimulation. A feeling of warmth comes over the surface. There is increased cerebral activity, due to a direct action on the nerve cells, the highest nerve centres being the first affected. The imagination and feelings become exalted; noises are magnified, and a sensation of light in the eye may be present. There is a feeling of oppression at the chest, and sometimes a choking sensation. Soon external impressions are but slight, questions are but slowly and imperfectly answered, and any sensation of pain which may have been present becomes greatly diminished, or entirely abolished. The pulse and respiration are slow, due to reflex inhibition, through stimulation of the nerves of the nose and larynx.

(2) Stage of Excitement. The patient is no longer conscious of what is going on around him, but he may struggle, shout, sing, laugh, cry, or talk during this stage. The respiration is now quickened, due to the stimulation of the vagus branches distributed to the lung; at the same time the pulse is quickened. This quickening of the respiration and pulse is in part due to paralysis of the nerves supplying the mucous membrane of the nose, larynx, and lungs, which, during the first stage, had caused slowing of both the respiration and pulse. The pupils may dilate, as the result of stimulation of the sympathetic nervous system.

This stage is generally most marked in men, especially those who have been accustomed to the use of alcoholic stimulants. In children and weakly persons it may be absent entirely, the patient passing quickly from the first to the third stage.

(3) Stage of Anæsthesia. There is general muscular relaxation; reflex action is entirely abolished, and there is total loss of consciousness and of sensation. The pupils are contracted, as the result of stimulation of the third nerve, or of its cerebral centre. The pulse and respiration are slow and steady; general reflexes being abolished, they are now under the control of their respective nervous mechanisms alone.

(4) Stage of Paralysis, or of Recovery. The respiratory centre itself becomes paralyzed, the respiration becomes slow, and feeble, and finally ceases. The heart's action becomes feeble, and may stop entirely. The blood pressure is lowered, as a result of enfeebled heart's action and paralysis of the vaso-motor centre. The pupils are dilated, as the result of paralysis of the third nerve, or of its centre. Death may come from paralysis of respiration, paralysis of the heart, or both.

If this stage is one of recovery, then returning consciousness is generally pleasant. The nervous system appears to be paralyzed in the following order: the brain, the sensory part of the cord, the motor tract of the cord, the sensory parts of the medulla oblongata, and, finally, the motor portion of the medulla, thereby producing death by failure of respiration. The order in which the nerve centres are paralyzed is sometimes changed, and the heart may stop before respiration ceases, or both functions may cease together.

Sometimes death may come suddenly during the administration of chloroform before the anæsthetic stage is complete. This is probably due to shock, causing sudden arrest of respiration, or of heart's action, or of both.

#### USE.

Chloroform may be used by inhalation to produce general anæsthesia. Extreme care must be used in the administration of chloroform as an anæsthetic. Not more than two or three per cent. of chloroform vapor should be present in the respired air. It is best given on an Esmarch's, or similar, inhaler, for this allows the free admixture of air.

Internally, chloroform has been used as an anthelmintic against tapeworms, twenty minims being administered with some convenient vehicle every half hour up to three doses, and this followed by a dose of castor oil.

#### TOXICOLOGY.

When dangerous symptoms arise during the administration of chloroform, the first thing to determine is *the cause*. If due to obstruction of the air passages, remove the obstruction. If due to shock, the result of too early operation, probably nothing that may be done will save the patient from death. If due to an overdose of chloroform, discontinue the drug. Use artificial respiration if necessary. If respiration is good and there is a tendency to heart-failure, give amyl nitrite by inhalation, or glonoin hypodermatically to cause dilatation of the blood-vessels, and thus relieve an over-distended heart. Artificial heat should be applied to the chest and extremities. Inversion of the body should *not* be practiced, for this throws extra work on an already paralyzed and over-dilated heart. Electricity is of *questionable* value. Cardiac and respiratory stimulants, such as strychnine, ammonia, etc., may be used hypodermatically, but are of questionable value.



## PREPARATIONS.

Aqua Chloroformi . . . . .	3.75- 7.50 Cc.	ʒi-ij.
Emulsum Chloroformi . . . . .	1.90- 3.75 Cc.	ʒ½-j.
Spiritus Chloroformi . . . . .	0.60- 1.25 Cc.	℥ x-xx.
Linimentum Chloroformi . . . . .	For external use.	

**Aqua Chloroformi.** Chloroform water is a saturated aqueous solution (1 in 200 parts).

## USE.

This is used as a carminative, anti-spasmodic, or anti-fermentative in certain gastric disturbances.

**Emulsum Chloroformi.** Chloroform emulsion consists of chloroform 40 Cc., expressed oil of almonds, 60 Cc., tragacanth, 15 Gm., and water to 1000 Cc.

## USE.

This is a convenient preparation of chloroform, for internal administration, in flatulence, colic, etc.

**Spiritus Chloroformi.** Spirits of chloroform is a 6 per cent. alcoholic solution of chloroform.

## USE.

This is another convenient preparation for the internal administration of chloroform.

**Linimentum Chloroformi.** Chloroform liniment consists of 300 parts of chloroform with 700 parts of soap liniment.

## USE.

For the local and temporary relief of pain in neuralgia, etc.

Φ **BROMOFORMUM.**  $\text{CHBr}_3$ .**Tribromomethane.**

An analogue of chloroform, produced by the action of bromine upon alcohol in the presence of an alkali.

A clear, colorless liquid, with a peculiar, but not unpleasant odor, and a sweetish taste. Sparingly soluble in water; freely soluble in alcohol and ether. Sp. gr. : 2.830 at 0° C. (32° F.). It must be protected from light, as it is readily decomposed.

Dose, 0.06-0.30 Cc. ℥ i-v.

## ACTION.

Anæsthetic, but not a safe one; antispasmodic; a local analgesic; and an antiseptic.

## USE.

This has been used of late in the treatment of whooping-cough. A daily dose of from 0.30–1.25 Cc. (℥. 5–20) may be given to a child. It is most conveniently prescribed as an alcoholic solution, with water.

IODOFORMUM.  $\text{CHI}_3$ .

**Iodoform.** Triiodomethane.

It should be kept in a cool place, in well-stoppered bottles.

It occurs in small, lemon-yellow, lustrous crystals, having an almost insuppressible, characteristic odor, and an unpleasant, iodine-like taste. Not perceptibly soluble in water, to which it imparts a slight odor and taste. Soluble in 52 parts of alcohol at 15° C.; in 12 parts of boiling alcohol; in 5.2 parts of ether; very soluble in chloroform, fixed, or volatile oils. Its solutions have a neutral reaction. Sp. gr.: 2.000 at 15° C.

It may be prepared by mixing an alcoholic solution of potash with tincture of iodine; or by the action of iodine on a mixture of alcohol and a solution of sodium, or potassium, carbonate. It contains about 97 per cent. of free iodine.

Dose, 0.06–0.18 Gm. gr. i–ijj.

## ACTION.

Iodoform has the action of a local anæsthetic, a local stimulant or irritant, an alterative, a kolysystic (that is having a restraining influence upon the development of bacteria). Its anæsthetic action is confined to denuded, or to mucous surfaces. Its other actions—stimulant, irritant, kolyseptic, and alterative—depend upon its liberation of fine iodine when in contact with moist living tissue. Through its general alterative action it seems to prevent the development of giant cells, and may thus hinder morbid tissue growth. It has a specific, though unexplained, action in inhibiting local tubercular processes.

## USE.

It may be used locally or hypodermatically (10 to 20 per cent. in sterilized glycerin, or olive oil) in the treatment of tubercular processes. It may be used locally in the treatment of syphilitic and non-syphilitic ulcers. Its kolyseptic action makes it a useful surgical dressing. It may be used for its anæsthetic action in the form of a suppository (0.30–0.60 Gm. gr. 5–10), in the treatment of painful hæmorrhoids, fissure of the anus, etc.

## TOXICOLOGY.

Large doses of iodoform have a marked action upon the nervous system, causing feverishness, sleeplessness, headache, irritability, and loss of

memory; in some cases delirium; in others drowsiness, symptoms of collapse, and death.

*Treatment*—Discontinue the use of the drug. Hasten its elimination through the kidneys by the free use of diluent diuretics. Stimulants may be required to control symptoms of depression.

### **Unguentum Iodoformi.**

This, a 10 per cent. ointment made with benzoated lard, is the only official preparation.

### **Φ DI-IODOFORMUM. $C_2I_4$ .**

**Di-iodoform.** Periodized ethylene.

This occurs as yellow prismatic needles, or as a yellow powder, almost odorless when protected from the light, and tasteless. Insoluble in water; sparingly soluble in alcohol, and in ether; soluble in chloroform. It should be kept in colored bottles protected from the light.

Prepared by treating periodized æstylen (C<sub>2</sub>I<sub>2</sub>) with an excess of iodine. It contains 95 per cent. of iodine.

Dose, 0.06–0.18 Gm. gr. i–iij.

### **ACTION AND USE.**

Di-iodoform has the general action of, and has been used as a substitute for, iodoform.

### **Φ IODOL. $C_4I_4NH$ .**

**Tetra-iodo-pyrrol.**

It occurs as a yellowish-brown, shining powder, free from odor or taste. Sparingly soluble in water; soluble in alcohol, ether, chloroform, and fixed oils.

Prepared from the pyrrol, which is obtained in Dippel's oil (bone oil), by an interaction between it and iodine. It contains nearly 87 per cent. of iodine.

Dose, 0.12–0.30 Gm. gr. ij–v.

### **ACTION.**

It is supposed to have the general action as iodoform, with the advantage of being less disposed to produce dangerous symptoms through absorption; and also of not having such a penetrating, disagreeable odor as has iodoform.

### **USE.**

So far, iodol has shown itself to be a poor substitute for iodoform. It has not come into general use, and probably never will.

**Φ SOZOIODOL.**  $C_6H_4I_2OHSO_3H$ .**Di-iod-para-phenol-sulphonic-acid.**

It occurs as a white, glittering powder; odorless, and of slightly acid taste. Soluble in water, alcohol, and glycerin.

Prepared by the interaction of potassium paraphenol sulphonate, dissolved in diluted hydrochloric acid, and a solution of potassium iodate and iodide, in molecular proportions. It contains 54 per cent. of iodine, 20 per cent. of carbolic acid, and 7 per cent. of sulphur.

**ACTION.**

Soziodol is supposed to have the action of carbolic acid and iodine, without poisonous properties. The carbolic acid is present in the form of carbol-sulphonic acid—a harmless compound.

**USE.**

This is intended as a substitute for iodoform, with the advantages of solubility, freedom from odor, and non-toxic properties.

**Φ ARISTOL.**  $C(OI)H_2C_6\left\{\begin{array}{l} C_6H_7 \\ CH_3 \end{array}\right.$ **Dithymol-diiodide.** Thymol-iodide.

It occurs as a brownish-red, odorless, somewhat unstable, amorphous powder, containing about 46 per cent. of iodine. Insoluble in water, or glycerin; slightly soluble in alcohol; freely soluble in ether; readily taken up by fatty oils, or by vaseline, when rubbed together with them. It is easily decomposed by light and heat.

Prepared through the decomposition of iodine, in a solution with potassium iodide, by an alcoholic solution of thymol.

**ACTION.**

Aristol is supposed to have the action of iodoform. It is weaker, however. It is also non-toxic.

**USE.**

It is used to some extent as a substitute for iodoform.

**Φ EUROPHEN.**  $2\left\{\begin{array}{l} C_6H_5 \\ CH_3 \end{array}\right\}C_6H_4O)HI$ .**Di-iso-butyl-ortho-cresol-iodide.**

An amorphous yellow powder of peculiar aromatic odor. Insoluble in water or glycerin; readily soluble in alcohol, ether, chloroform, and oils. Like aristol it is easily decomposed by light or heat. In contact with water or aqueous secretions (wound secretion) small quantities of iodine seem to be given off that are again taken up. It contains about 22 per cent. of iodine, and is five times as bulky as iodoform.

It is obtained by the interaction of iso-butyl-alcohol, and ortho cresol in the presence of zinc chloride, at a high temperature, when iso-butyl-ortho-cresol is formed. This, dissolved in a dilute alkaline solution and precipitated with a solution of iodine and potassium iodide, yields europhen, which is washed and dried in the dark.

Dose : 0.30–0.60 Gm. gr. v–x.

#### ACTION.

Europhen has the general action of iodoform. It is non-toxic.

#### USE.

It may be used as a substitute for iodoform.

#### ÆTHER.

##### Ether.

A liquid composed of about 96 per cent., by weight, of absolute ether, or ethyl oxide  $[(C_2H_5)_2O]$ , and about 4 per cent. of alcohol, containing a little water.

Ether should be kept in well-stoppered containers, preferably in tin cans, in a cool place, remote from lights, or fire.

A transparent, colorless, mobile liquid, having a characteristic odor, a burning and sweetish taste, and a neutral reaction. Sp. gr., 0.725 to 0.728, at 15° C. It boils at 37° C. (98.6° F.). Soluble in ten times its volume of water at 15° C. Miscible, in all proportions, with alcohol, chloroform, fixed, and volatile oils.

It is highly volatile, and inflammable. Its vapor, when mixed with air and ignited, explodes violently.

Obtained by dehydrating ethylic alcohol, by means of sulphuric acid, and purifying the product.

#### ACTION.

Locally, evaporation is so rapid as to produce anæsthesia by freezing the part; continued for some time, the part may be destroyed, and separate as a slough. If evaporation is prevented, it will then act as a local stimulant, or irritant.

It has a similar irritant action on mucous membranes, both during administration, and elimination. In the stomach, it increases the secretion of gastric juice, increases peristalsis, and hastens the expulsion of flatus. It probably tends to increase the co-ordination of the movements of the stomach, and intestines, thus relieving spasms. When inhaled, it causes marked irritation of the air passages, producing paroxysmal coughing and temporary arrest of respiration, due to spasm. During elimination by the lungs and kidneys dangerous symptoms may result from the irritation produced. On entering the general circulation it still acts as a stimulant.



It is one of the most diffusible and rapid of cardiac stimulants, but fleeting in its effects. It also stimulates the respiratory center, in ordinary doses.

In large doses (generally by inhalation), ether has a narcotic action, producing general anæsthesia, and even death. Like chloroform, it acts first on the brain, then on the sensory centers of the cord, then on the motor centers of the cord, next the sensory centers of the medulla, and finally the motor centers (including that of respiration) of the medulla. Death comes from paralysis of respiration. As with chloroform the anæsthesia produced by ether has four stages :

- (1) The stage of stimulation, which is prolonged.
- (2) The stage of excitement, which is marked and prolonged.
- (3) The stage of anæsthesia.
- (4) The stage of paralysis, or of recovery, which is apt to be accompanied by a series of disagreeable symptoms.

The vapor of ether is administered in as concentrated a form as possible. A close mask is used in order to exclude any admixture of air.

#### USE.

Ether is used by inhalation as a general anæsthetic.

Compared with chloroform ether has the following advantages and disadvantages :

##### *Advantages.*

Ether is safer, during all stages of anæsthesia  
for heart,  
for respiration.

As a rule ether is not so treacherous as chloroform.

##### *Disadvantages.*

Ether is not so pleasant to take as chloroform.

The odor is disagreeable.

The vapor is suffocating.

The stage of excitement is marked.

Vomiting is often present.

Because of its irritating action ether is

Not so safe in disease of the lungs.

Not so safe in disease of the kidneys.

Not so safe because of possible suffocative catarrh following its use.

Because the vapor is inflammable ether is

Not so safe in the presence of gas- or lamp-light.

Not so safe when using the actual cautery.

Recovery from ether anæsthesia is tedious and often accompanied by a train of very unpleasant symptoms.

Ether may be used as a local anæsthetic in minor surgical operations, but it is inferior to many other drugs, for this action.

It may be used hypodermatically, for its prompt stimulating effect; in cases of shock, etc., 0.60–0.95 Cc. (min. 10 to 15) may be used every ten minutes, up to three or four injections.

It may be used with cod-liver oil, to favor the digestion of the oil.

Because of its solvent properties, it may be used to aid in cleansing a surface preparatory to a surgical operation.

#### PREPARATIONS.

*Spiritus Ætheris* . . . . . 0.60–1.25 Cc. ℥<sub>x</sub>–xx.

*Spiritus Ætheris Compositus* . . . . . 0.60–1.25 Cc. ℥<sub>x</sub>–xx.

**Spiritus Ætheris.** Spirit of ether is an alcoholic solution containing 32.5 per cent. of ether.

**Spiritus Ætheris Compositus.** Compound spirits of ether, (Hoffman's anodyne). This is an alcoholic solution containing 32.5 per cent. of ether and 2.5 per cent. of ethereal oil.

#### USE.

These two preparations are used internally—by preference the Hoffman's anodyne—when the stimulating, or anti-spasmodic, action of ether is wanted.

#### OLEUM ÆTHEREUM.

##### Ethereal Oil.

This is a transparent, nearly colorless, volatile liquid, with a peculiar aromatic, ethereal odor, a pungent, refreshing, bitter taste, and a neutral reaction. Sparingly miscible with cold water; readily miscible with alcohol, and ether. Sp. gr.: 0.910, at 15° C. It consists of equal volumes of heavy oil of wine, and ether.

#### ACTION.

It has a stimulating, and sedative action.

#### USE.

As an ingredient of Hoffman's anodyne it is used to increase the stimulant, anti-spasmodic, and sedative action of ether.

#### ÆTHER ACETICUS.

##### Acetic Ether.

A liquid composed of 98.5 per cent., by weight, of ethyl acetate ( $C_2H_5C_2H_3O_2$ ), and about 1.5 per cent. of alcohol containing a little water.

It should be kept in well-stoppered bottles, in a cool and dark place, remote from lights or fire.

A transparent, colorless liquid, of a fragrant and refreshing, slightly acetous odor, a peculiar acetous and burning taste, and a neutral reaction. Sp. gr.: 0.893 to 0.895 at 15°C. It boils at about 76° C. (168.8° F.). It is readily volatilized, even at a low temperature. It is inflammable. Soluble in about 8 parts of water at 15° C. Miscible in all proportions, with alcohol, ether, fixed, and volatile oils.

Obtained by the action of sodium acetate on the dehydrated product resulting from the action of sulphuric acid on ethylic alcohol.

Dose: 0.60–1.25 Cc.; ℥<sub>x-xx</sub>.

#### ACTION.

Stimulant, and anti-spasmodic. It has an action similar to that of ether; but being less volatile, is less rapidly absorbed and eliminated, and its effects are more lasting. It is not used as an anæsthetic because it is too slow in action. It has a pleasanter flavor than ether.

#### USE.

Internally, or hypodermatically, it may be used in the same class of cases as those calling for the use of ether, namely; colic, flatulence, syncope, etc.

#### SPIRITUS ÆTHERIS NITROSI.

**Spirit of Nitrous Ether.** Sweet Spirits of Nitre.

An alcoholic solution of ethyl nitrite ( $C_2H_5NO_2$ ), yielding when freshly prepared and tested in a nitrometer, not less than 11 times its own volume of nitrogen dioxide (NO).

A clear, mobile, volatile, and inflammable liquid, of a pale yellowish, or faintly greenish-yellow tint; having a fragrant, ethereal, and pungent odor free from acidity, a sharp, burning taste, and a neutral reaction. Sp. gr. about 0.836 to 0.842 at 15° C.

Prepared by distilling alcohol with sodium nitrite and sulphuric acid, and diluting the distillate.

Dose: 0.95–3.75 Cc.; ℥<sub>xv-3j</sub>.

#### ACTION.

Diaphoretic, diuretic, and anti-spasmodic. In full doses its action upon the blood and upon the nervous system is like that of other nitrites. (See amyl nitrite.)

#### USE.

This preparation is not so frequently used now as in times past. It may be given for its diaphoretic action in slight febrile conditions. It is sometimes used for its diuretic action.

Φ METHYL CHLORIDE.  $\text{CH}_3\text{Cl}$ .

**Monochlormethane.** Chlormethyl.

A gaseous compound, colorless, slightly inflammable, with an ethereal odor. Easily liquefied under pressure. Soluble in water, alcohol, ether, and chloroform. Sp. gr. : 0.9915. It boils at  $21^\circ \text{C}$ . ( $58^\circ \text{F}$ .).

It is obtained by the action of hydrochloric acid gas upon methyl alcohol.

ACTION.

A local anæsthetic.

USE.

As a spray, or by means of a cotton pledget, methyl chloride may be used to produce local anæsthesia, for the purpose of performing minor surgical operations, or of relieving pain due to neuralgia, etc.

Φ METHYLENE BICHLORIDE.  $\text{CH}_2\text{Cl}_2$ .

**Dichlormethane.** Methylene Dichloride, Methylene Chloride.

It should be kept in glass-stoppered bottles, and in a cool place. Its vapor is inflammable.

A colorless liquid, resembling chloroform in odor, reaction, and solubility. Sp. gr. : 1.360 at  $15^\circ \text{C}$ .

It may be prepared by the action of chlorine on marsh-gas, or by the reduction of chloroform.

The English so-called *methylene chloride* is a *mixture* of ethylic ether and methylene bichloride.

ACTION.

Anæsthetic, like that of chloroform, but not so safe. It has local analgesic properties.

USE.

This drug may be used in the form of a spray, to produce local anæsthesia.

Φ ETHYL CHLORIDE.  $\text{C}_2\text{H}_5\text{Cl}$ .

**Hydrochloric Ether.**

A colorless liquid, having a strong, saccharine taste, and a penetrating, ethereal odor. It is inflammable, very volatile, and boils at  $10^\circ \text{C}$ . ( $50^\circ \text{F}$ .). Soluble in 50 parts of water. Very soluble in alcohol. Sp. gr. : 0.9214 at  $0^\circ \text{C}$ . ( $32^\circ \text{F}$ .).

Prepared from alcohol and absolute hydrochloric acid. Because it is so very volatile, it is put up in small tubes, containing about 10 Cc. each, and hermetically sealed with a capillary point, or in a larger tube with a capillary orifice upon which a tightly fitting cap is screwed.

## ACTION.

Ethyl chloride has the action of a diffusible stimulant ; of a general anæsthetic ; and of a local anæsthetic.

## USE.

It is used only as a local anæsthetic in minor surgical operations ; in dental practice ; for the relief of neuralgic pains ; etc.

Φ ETHYL BROMIDE.  $C_2H_5Br$ .**Bromethyl. Æther-bromatis. Hydrobromic Ether.**

It is a colorless, volatile, limpid, non-inflammable liquid, with an odor resembling that of chloroform, and a burning, sweetish taste. Not miscible with water, but freely so with alcohol, ether, chloroform, and oils. Sp. gr. : 1.380 to 1.420 at 15° C. It boils at 40° C. (104° F.).

It is decomposed under the combined action of light and air, and must be kept in glass-stoppered bottles remote from the light, or in colored glass tubes hermetically sealed.

Prepared by mixing alcohol and pure concentrated sulphuric acid together, allowing the mixture to cool, then placing it in a retort, adding powdered potassium bromide, distilling, and purifying the product ; or, by distilling alcohol with bromine and phosphorus.

Dose (by inhalation) 3.75-7.50 Cc. ʒi-ij.

## ACTION.

That of a general anæsthetic, with prompt but transitory effect. The pulse is (1) increased in frequency, due to stimulation of the automatic cardiac centres ; (2) slowed, probably through its influence on the inhibitory mechanism of the heart. There is a slight depressant action upon the heart. Blood pressure is but little affected. There is no vaso-motor paralysis. Respiration becomes slow, shallow, and stertorous. Death, when it occurs, is due to respiratory failure. The pupils are hardly contracted even by large doses. Reflexes are not necessarily abolished.

As an anæsthetic this drug has the following advantages : (1) Prompt action, a few seconds being sufficient time to produce anæsthesia. (2) Transitory effect, the anæsthesia passing away in the course of a few minutes on the withdrawal of the inhaler. (3) Slight, if any, disagreeable effects ; nausea is never pronounced ; vomiting, if present, is not persistent, and may not occur at all, even though food may have been taken but a short time before ; there is no irritation of the mucous membranes, as from ether.

The disadvantages are : (1) Its toxic effects, which are probably less than those from chloroform. (2) It is not suitable for long operations. (3) The unpleasant after-taste in the mouth.



## USE.

It may be used in minor surgery, especially about the mouth, nose and throat; in obstetric practice; in dentistry. It should be administered from an inhaler in concentrated form, 1 to 2 Cc. (℥ 15 to 30) at a time.

Φ ETHYL IODIDE.  $C_2H_5I$ .**Hydriodic Ether.**

A colorless, non-inflammable liquid, with a penetrating ethereal odor, and a pungent taste. Insoluble in water. Soluble in alcohol, and ether. Sp. gr. : 1.920. Boils at  $71^{\circ} C.$  ( $160^{\circ} F.$ ).

Obtained by gradually and cautiously mixing together, in proper proportions, alcohol, iodine, and phosphorus, and distilling the product.

It should be kept in glass-stoppered vials, or in glass capsules, as it is decomposed by exposure to air, liberating iodine.

Dose (by inhalation), 0.30–0.60 Cc. ℥v–x.

## ACTION.

Ethyl iodide has the action of a general stimulant, an anti-spasmodic, an anæsthetic, or an alterative.

## USE.

It may be used by inhalation to bring the system quickly under the influence of iodine in the treatment of subacute or chronic bronchitis, asthma, etc.

PARALDEHYDUM.  $C_6H_{12}O_3$ .**Paraldehyde.** Elaldehyde.

A polymeric form of ethylic aldehyde,  $C_2H_4O$ . It should be kept in well-stoppered, dark amber-colored bottles, in a cool place.

A colorless, transparent liquid, having a strong, characteristic odor, and a burning, intensely disagreeable, and, afterward, cooling taste. Soluble in 8.5 parts of water at  $15^{\circ} C.$  Miscible in all proportions with alcohol, ether, and fixed, or volatile oils. Sp. gr. : 0.998. Its reaction is neutral, or slightly acid. It boils at  $123^{\circ}$ – $125^{\circ} C.$  ( $253.4^{\circ}$ – $257^{\circ} F.$ ), giving off inflammable vapors.

Dose : 0.95–3.75 Cc. ; ℥xv–zi.

## ACTION.

Paraldehyde is a pure hypnotic, causing sleep like chloral. It has not nearly so depressing an action upon the heart, or respiration, as has chloral. Its local action may cause irritation of the pharynx and stomach. A condition of tolerance may soon be established. Should death result from the use of paraldehyde, it would probably be due to paralysis of respiration.

## USE.

To produce sleep. Its disagreeable flavor will limit its therapeutic use.

Φ CHLORAL.  $C_2HCl_3O$ .

This is a thin, oily, colorless liquid not used in medicine. It unites with one molecule of water, forming chloral hydrate.

Chloral is prepared by saturating absolute alcohol with dry chlorine gas. The alcohol is first reduced to aldehyd, and this is attacked by chlorine forming tri-chloraldehyd, a word which has been shortened to chloral.

CHLORAL.  $C_2HCl_3O + H_2O$ .

## Chloral Hydrate.

The official name of this drug is unfortunate, for it is *not* chloral, but *chloral hydrate*.

Chloral hydrate occurs in whitish crystals, slowly evaporating when exposed to the air, having a peculiar, pungent odor, a disagreeable taste, and a neutral reaction. Soluble in water, alcohol, ether, chloroform, fixed, or volatile oils. It liquefies when rubbed with camphor, carbolic acid, menthol, or thymol. Its aqueous solution soon acquires an acid reaction, but its alcoholic solution remains neutral.

It should be kept in glass-stoppered bottles, in a cool, and dark place.

Dose: 0.60–1.25 Gm.; gr. x–xx.

## ACTION.

Locally, chloral has an irritant, and an antiseptic action. Absorbed it acts as a pure hypnotic through its direct influence upon the cerebral centres. It also has a depressing action upon the motor tract of the spinal cord, and produces general muscular relaxation. Medicinal doses have no effect upon sensation.

Blood pressure is lowered (1) through dilatation of the blood-vessels, resulting from paralysis of the vaso-motor centre; (2) through weakened heart's action.

The heart's action is (1) quickened, because of diminished resistance on the part of the dilated vessels; (2) slowed because of paralysis of the cardiac ganglia.

The blood is not changed by small doses, but after large doses it becomes dark; the corpuscles swollen, but not dissolved.

Respiration is not affected by moderate doses, but by poisonous doses the breathing grows slower, weaker, and finally ceases. This is due to paralysis of the respiratory centre.

Temperature is but slightly influenced by ordinary doses, but large (toxic) doses cause a steady, and rapid, fall of temperature. This is due, in part to diminished heat production, in part to increased heat dissipation.

Through its irritant action chloral may cause nausea, and even vomiting. It may also cause nephritis during its elimination by the kidneys.

The urine may respond to certain sugar tests during the administration of chloral.

#### USE.

Chloral may be used to secure sleep where the insomnia is due to some cerebral disturbance, and not to pain. It may be used to secure muscular relaxation in tetanus, strychnine poisoning, infantile convulsions, puerperal convulsions not dependent upon nephritis, etc.; also during labor, to relax a rigid os.

#### TOXICOLOGY.

The poisonous symptoms produced by chloral are those of coma, cardiac and respiratory paralysis. There is general muscular relaxation. The pupils are dilated. The temperature may be sub-normal.

*Treatment.*—In poisoning from chloral remove any of the unabsorbed drug that may still be present in the stomach, by means of the syphon-tube; keep up the body temperature by means of artificial heat, swathing the extremities, and the body, in non-conducting material, such as cotton-batting; use cardiac stimulants, such as strychnine, ammonia, ether, etc. Keep the patient in the recumbent posture.

#### CROTON CHLORAL. $C_4H_5Cl_3O + H_2O$ .

##### Butyl-chloral-hydrate.

It occurs in the form of crystalline, micaceous scales, of a pungent odor, and acrid, disagreeable taste. Sparingly soluble in water; freely soluble in hot water, and alcohol, but insoluble, or nearly so, in chloroform. The aqueous solution is neutral, or but slightly acid.

Prepared by passing dry chlorine through aldehyd cooled to  $-10^{\circ} C.$  ( $14^{\circ} F.$ ). Fractional distillation is resorted to, and the product boiling between  $163^{\circ}$  and  $165^{\circ} C.$  ( $325.4^{\circ}$ – $329^{\circ} F.$ ) is reserved; this is butyl-chloral, a colorless, oily liquid; the necessary amount of water is added and butyl-chloral-hydrate is the result.

Dose: 0.60–1.25 Gm. gr. x–xx.

#### ACTION.

The action of croton chloral is closely allied to that of chloral. It has, however, a more marked analgesic action, and a less depressing action upon the heart, and respiration, than has chloral.

#### USE.

It may be used in sleeplessness even when this is due to pain. It may also be used in some forms of neuralgia.

**Φ CHLORALAMIDE.**  $\text{CCl}_3\text{CHOHCONH}_2$ .**Chloral-formamide.**

It occurs in lustrous, colorless, odorless crystals, with a slightly bitter taste. Slowly soluble, at  $15^\circ \text{C}$ ., in 20 parts of water, or in 1.5 parts alcohol. Decomposed by water heated to  $60^\circ \text{C}$ . ( $140^\circ \text{F}$ .), and also by the action of alkalies, into chloral hydrate and ammonium formate.

Prepared by the interaction of chloral (*not* chloral hydrate) and formamide.

Dose: 0.60–1.25 Gm. gr. x–xx.

**ACTION.**

That of a pure hypnotic. This, like croton chloral, is more of an analgesic, and at the same time less of a cardiac, and respiratory, depressant than is chloral. It has also less irritant properties than chloral.

**USE.**

Chloralamide may be used for its hypnotic action; it is safer than chloral. It may also be used in some forms of neuralgia.

**HYPNAL.****Mono-chloral-antipyrine.**

It occurs in large transparent crystals; odorless, and with a slight saline taste. Soluble in 6 parts of water.

Prepared by mixing 47 parts of chloral hydrate, in solution, with 53 parts of antipyrine, in solution; an oily-looking liquid results. This, if drawn off and allowed to stand a sufficient length of time, solidifies into a mass of rhombic crystals.

Dose: 0.60–1.25 Gm. gr. x–xx.

**ACTION.**

Hypnal has the action of its components, and is, therefore, both analgesic, and hypnotic.

**USE.**

When it is necessary both to relieve pain, and to produce sleep.

**SOMNAL.**  $\text{C}_7\text{H}_{12}\text{Cl}_2\text{O}_3\text{N}$ .**Ethylated chloral-urethane.**

It is a clear, colorless liquid, having a hot, burning taste. It is a solution of chloral hydrate, and urethane, in alcohol.

Dose: 0.60–1.25 Cc. ℥x–xx.

**ACTION.**

Somnal is a pure hypnotic, with the general action of chloral.

**USE.**

It may be used in the same class of cases as call for the use of chloral.

**Φ AMYLENE HYDRATE.**  $(\text{CH}_3)_2\text{C}_2\text{H}_5\text{COH}$ .**Di-methyl-ethyl-carbinol.** Tertiary amyl alcohol.

It is an isomer of amylic alcohol ( $\text{C}_5\text{H}_{12}\text{O}$ .) obtained by the action of sulphuric acid upon amylene at a low temperature.

It is a limpid, colorless, hygroscopic liquid, with a peculiar, penetrating, ethereal odor, and a hot, aromatic, pungent taste. Soluble in 8 parts of water, at  $15^\circ \text{C}$ .; freely soluble in alcohol, chloroform, and ether. Sp. gr. : 0.810.

Dose: 1.90–3.75 Cc.  $\text{ʒ } \frac{1}{2}$ –i.

**ACTION.**

As an hypnotic, this drug holds a place between chloral and paraldehyde, so far as safety and efficiency are concerned. It has also some anodyne, and anti-spasmodic action.

**USE.**

Like chloral, as an hypnotic. It has been used in small doses (0.18–0.24 Cc.  $\mathfrak{M}$  iij–vj) as an antispasmodic in whooping-cough.

**Φ SULPHONAL.**  $(\text{CH}_3)_2\text{C}(\text{SO}_2\text{C}_2\text{H}_5)_2$ .**Diethyl-sulphon-dimethyl-methane.**

It occurs in colorless, odorless, nearly tasteless crystals. Sparingly soluble in cold water; soluble in 15 parts of boiling water; soluble in alcohol, and in ether. It is a very stable substance.

Obtained by the interaction of anhydrous ethyl-hydro sulphide, and anhydrous acetone, in the presence of hydrochloric acid gas.

Dose: 0.95–1.90 Gm. gr. xv–xxx.

**ACTION.**

This is a pure hypnotic, through direct action on the cerebral centres. Medicinal doses have no effect on the respiration or circulation; it is, therefore, safer than some of the older hypnotics. On the other hand, it is sometimes slow in its action, and cumulative in the system. Its use may be followed by disagreeable symptoms, such as anorexia, vomiting, diarrhoea, giddiness, headache, or depression. It is said also to increase arterial tension, and to be contra-indicated in angina pectoris.

**USE.**

Like chloral, as an hypnotic. Its effects are more promptly secured when administered in some warm vehicle, as tea, broth, milk; or as an alcoholic solution.



Φ **TRIONAL**.  $\text{CH}_3\text{C}_2\text{H}_5\text{C}(\text{SO}_2\text{C}_2\text{H}_5)_2$ .

### Diethyl-sulphon-methyl-ethyl-methane.

This occurs as colorless, odorless, shining, crystalline plates, which melt at  $76^\circ \text{C}$ . ( $169^\circ \text{F}$ ). It is sparingly soluble in cold water; soluble in hot water, alcohol, and ether.

Obtained by the interaction of anhydrous ethyl-hydro sulphide and methyl-ethyl-ketone in the presence of hydrochloric acid gas.

Dose: 0.30–0.95 Gm. gr. v–xv.

#### ACTION.

Hypnotic, like sulphonal. The advantages claimed for this preparation over sulphonal are that it is a more powerful hypnotic; that its action is more prompt; and that unpleasant after-effects are fewer, or absent altogether.

#### USE.

Like sulphonal, as an hypnotic. This too, like sulphonal, is best given in some warm vehicle, or alcoholic solution.

Φ **TETRONAL**.  $(\text{C}_2\text{H}_5)_2\text{C}(\text{SO}_2\text{C}_2\text{H}_5)_2$ .

### Diethyl-sulphon-diethyl-methane.

It occurs in colorless, and odorless, shining plates, and laminæ, melting at  $89^\circ \text{C}$ . ( $192.2^\circ \text{F}$ ). It is sparingly soluble in cold water; soluble in hot water, alcohol, and ether.

Diethyl-ketone-mercaptol, upon oxidation with potassium permanganate, yields tetronal.

Dose: 0.30–0.95 Gm. gr. v–xv.

#### ACTION.

Hypnotic, like sulphonal.

#### USE.

After the manner of sulphonal, or trional, as an hypnotic.

#### AMYL NITRIS.

### Amyl Nitrite.

A liquid containing about 80 per cent. of amyl nitrite ( $\text{C}_5\text{H}_{11}\text{NO}_2$ ), together with variable quantities of undetermined compounds. It is a clear-yellow, or pale-yellow liquid, of a peculiar, ethereal, fruity odor, and a pungent, aromatic taste. It is almost insoluble in water; miscible in all proportions with alcohol, or ether. In alcoholic solution it gradually decomposes, with the formation of ethyl nitrite, and amylic alcohol. It is very volatile, and is inflammable. Sp. gr.: 0.870–0.880, at  $15^\circ \text{C}$ .

It should be kept in small, dark amber-colored, and glass-stoppered bottles, or in glass capsules ("pearls"), in a cool, dark place, remote from fire and light.

Prepared by the action of nitric, or nitrous, acid on amylic alcohol.  
Dose, 0.18–0.30 Cc. Mij–v.

#### ACTION.

Amyl nitrite is antispasmodic, sedative, and depressant. It causes a great reduction of blood-pressure, by depressing the vaso-motor centres, thus producing marked dilatation of the blood vessels. The pulse rate becomes rapid, because of diminished resistance from the blood-vessels which have become suddenly dilated; also, because of the diminished restraint of the inhibitory apparatus of the heart. The heart muscle may be stimulated by very small doses, but this is doubtful. The arterial blood has a chocolate color, due to the formation of methæmoglobin, which is not so readily reoxidized as is hæmoglobin. The temperature may be reduced because of (1) diminished oxidation, and (2) increased dissipation of heat.

By its depressing effect upon the motor tract of the spinal cord, reflex action is diminished.

Elimination takes place through the lungs, and kidneys. The urine sometimes contains sugar.

The sensations produced by amyl nitrite are, fullness in the head, ringing in the ears, muscular relaxation, and tumultuous heart action.

Nitrous acid is one of the products of decomposition of amyl nitrite, and it is to this acid that the nitrites owe their action. The depressant action of amyl nitrite is very rapid—next to hydrocyanic acid.

#### USE.

Amyl nitrite is used where speedy action of the nitrites is required, as during the spasm of angina pectoris, whooping-cough, or asthma; in threatened paralysis of the heart from chloroform poisoning, fright, or insufficient compensation; to ward off a threatened epileptic fit. The drug is administered by inhalation.

#### SPIRITUS GLONONINĪ.

**Spirit of Glonoin.** Spirit of nitro-glycerin.

This is a 1 per cent. alcoholic solution of glonoin. It should be kept, and transported, in well-stoppered tin cans, and should be stored in a cool place, remote from lights and fire.

It is a clear, colorless liquid, possessing the odor and taste of alcohol.  
Sp gr. : 0.826 to 0.832, at 15° C. Reaction neutral.

Dose, 0.06–0.12 Cc. Mi–ii.

#### ACTION.

Glonoin is not a nitrite, but after absorption it is decomposed in the body, and has the action of the nitrites, which is represented by amyl

nitrite, see p. 186. Its effects are not so quickly apparent as are those from amyl nitrite, but they are more prolonged.

#### USE.

Spirits of glonoin is used, per orem or hypodermatically, when a more prolonged action of the nitrites is wanted than that produced by amyl nitrite.

#### SODII NITRIS. $\text{NaNO}_2$ .

##### Sodium Nitrite.

This occurs in white, opaque, fused masses, usually in the form of pencils, or as colorless, transparent crystals; odorless, having a mild, saline taste, and a neutral reaction. Soluble in 1.5 parts of water, at  $15^\circ \text{C}$ ., and very soluble in alcohol.

It should be kept in well-stoppered bottles.

Dose, 0.18–0.30. Cc. gr. iij–v.

#### ACTION.

This has a still slower, but more persistent, action than has amyl nitrite, or glonoin. Its general action is that of amyl nitrite.

#### USE.

It may be used in such cases as require the prolonged action of the nitrites.

#### ACIDUM CARBOLICUM. $\text{C}_6\text{H}_5\text{OH}$ .

##### Carbolic Acid. Phenol.

A constituent of coal tar obtained by fractional distillation, and subsequently purified. It should be kept in dark, amber-colored, well-stoppered vials.

It occurs as colorless, needle-shaped crystals, or as a white, crystalline, mass, sometimes acquiring a reddish tint, having a characteristic, somewhat aromatic odor, and, when diluted with water, a sweetish taste, with a slightly burning after-taste. Its reaction is slightly acid. Deliquescent on exposure to damp air. Soluble in about 15 parts of water, at  $15^\circ \text{C}$ ., the solution varying according to the degree of hydration of the acid; very soluble in alcohol, ether, chloroform, glycerin, fixed, and volatile oils.

When gently heated, carbolic acid melts, forming a highly refractive liquid. It is also liquefied by the addition of 8 per cent. of water. It should have a boiling point not higher than  $188^\circ \text{C}$ . ( $370.4^\circ \text{F}$ .).

#### PREPARATIONS.

Acidum Carbolicum . . . . . 0.06–0.12 Cc. Mj–ij.

Glyceritum Acidi Carbolici (20 per cent.) . 0.12–0.30 Cc. Mj–v.

Unguentum Acidi Carbolici (5 per cent.) . For external use.

## ACTION.

This is an active deodorant, antiseptic, and disinfectant, destroying bacteria if already present; preventing their development if used early. It may also prevent the action of organic ferments. In weak solutions it paralyzes the peripheral sensory nerves, causing anæsthesia. Pure, or in strong solutions, it acts as a caustic, forming a dry, parchment-like, aseptic eschar. It coagulates albumin, and therefore cannot burn deeply. Absorbed, it diminishes heat production, and increases heat dissipation, thus acting as an antipyretic.

Elimination takes place chiefly through the kidneys as sulpho-carbolates, and as hydroquinone. It sometimes causes a dark-brown, smoky urine, due to some oxidation product not yet determined. There may be marked irritation of the kidneys, even to the degree of causing total suppression of the urine. The characteristic smoky urine, resulting from the use of carbolic acid is one of the early toxic symptoms.

## USE.

Carbolic acid may be used (2 to 5 per cent. solution) in preparing the patient for an operation, and the surgeon for operating. It is an excellent antiseptic for use in rendering instruments aseptic, because of its non-corrosive properties. It may be used (2 to 5 per cent. solution) for cleansing, and as a dressing for, septic surfaces. Its anæsthetic action makes it useful (1 to 3 per cent. solution) in the treatment of burns, certain forms of skin disease with marked pruritis, etc. By inhalation, it may be used for its antiseptic action in the treatment of chronic bronchitis, phthisis, etc.

Internally, it may be used to prevent gastric fermentation, or to relieve vomiting, due to gastric irritability.

## TOXICOLOGY.

Through its action on the nerve centres, carbolic acid is an extremely rapid poison—second only to hydrocyanic acid—causing death by paralysis of the heart, or, in smaller but still poisonous quantity, by paralysis of respiration. It also acts as an irritant poison, because of its caustic properties.

During the therapeutic use of carbolic acid, toxic symptoms may appear if the quantity administered is too large. These symptoms are, restlessness, smoky urine, diminished secretion of urine, pain in the lumbar region, and pyrexia.

*Treatment.*—In sub-acute poisoning, discontinue the use of the drug, and treat symptoms. In acute poisoning use magnesium, or sodium, sulphate in order to form the harmless sulpho-carbolates. Demulcents

should be used, but not in the form of oils. Cardiac and respiratory stimulants will probably be required.

#### ACIDUM CARBOLICUM CRUDUM.

##### Crude Carbolic Acid.

A liquid consisting of various constituents of coal tar, chiefly cresol and phenol, obtained by fractional distillation.

It is a nearly colorless, or reddish-brown liquid; of a strongly empyreumatic and creosote-like odor, and a slightly acid reaction. Soluble in 15 parts of water, at 15° C.

##### ACTION.

This has the general action of pure carbolic acid, but is in all points more active.

##### USE.

This is not a suitable preparation for therapeutic use, but is a very efficient disinfectant for use in vaults, cess-pools, etc.

#### SODII SULPHOCARBOLAS. $\text{NaC}_6\text{H}_5\text{SO}_4\cdot 2\text{H}_2\text{O}$ .

##### Sodium Sulphocarbolate.

It occurs in colorless, transparent prisms; odorless, or nearly so, having a cooling, saline and somewhat bitter taste. Soluble, at 15° C., in 4.8 parts of water, and in 132 parts of alcohol.

Prepared from sodium carbonate by decomposing with barium sulphocarbolate. The barium sulphocarbolate is obtained by mixing equal parts of carbolic acid and strong sulphuric acid, allowing them to stand for some days, diluting, and neutralizing with barium carbonate.

Dose: 0.30–0.95 Gm. gr. v–xv.

##### ACTION.

Sodium sulphocarbolate has little, if any, local action. If decomposed, it then has the action of carbolic acid, to a limited extent. It thus has a mild antiseptic action throughout the alimentary canal, and along the lines of elimination.

##### USE.

It may be used in the treatment of vomiting, due to gastric fermentation, or irritation; the vomiting of pregnancy; certain forms of diarrhoea, etc. It has also been highly extolled in the treatment of scarlatina.

#### Φ TRIKRESOL.

This is a white liquid, with a creosote-like odor, and taste. Miscible with 40 parts of water, forming a clear solution. Sp. gr.: 1.042 to 1.049. It represents the three kresols—ortho-, para-, and meta-kresols; hence the name.



Prepared from coal tar, but its method of preparation is not disclosed by the manufacturers.

Dose: 0.06-0.18 Cc. ℥i-ij.

#### ACTION.

This is a new, and excellent, germicide, even in the presence of albumin. It has the general action of, and is said to be more efficient than, carbolic acid. At the same time it is less irritating, and less toxic.

#### USE.

After the manner of carbolic acid, as a germicide, in surgical, and obstetrical work.

#### Φ LYSOL.

This is a brown, oily looking liquid with a creosote-like odor. Miscible with water, forming a clear, saponaceous, frothy liquid. It is also miscible with alcohol, chloroform and ether. Sp. gr.: 1.042. Obtained from coal tar by a German patented process. It is said to contain 50 per cent. of kresols.

Dose: 0.06-0.18 Cc. ℥i-ij.

#### ACTION.

It has the general action of carbolic acid. It is said to be more active, as a germicide, and at the same time less toxic, than carbolic acid.

#### USE.

It may be used as an antiseptic in surgical, and obstetrical work; also as a disinfectant in vaults, cess-pools, stables, etc.

#### Φ CREOLIN.

This is a dark-brown, alkaline, syrupy liquid, which forms a turbid, saponaceous mixture, or emulsion, with water. It is miscible with alcohol, chloroform and ether. Sp. gr.: 1.040 to 1.080. It has a characteristic, tar-like odor and taste. Obtained from coal-tar by a patented process.

Dose: 0.06-0.18 Cc. ℥i-ij.

#### ACTION.

This has the general action of carbolic acid, than which it is said to be more active and less toxic.

#### USE.

After the manner of carbolic acid.

#### Φ BROMOL. $C_6H_2Br_3OH$ .

#### Tri-bromo-phenol.

It occurs in white crystals, with an unpleasant, bromine-like odor, and

a sweet, astringent taste. Insoluble in water, but freely soluble in alcohol, chloroform, ether, glycerin, and oils.

Obtained by precipitating a weak solution of carbolic acid with bromine; dissolving this precipitate in an alkali, and re-precipitating with acid, gives tri-bromo-phenol.

Dose: 0.006–0.02 Gm. gr.  $\frac{1}{10}$ – $\frac{1}{8}$ .

#### ACTION AND USE.

That of carbolic acid. See p. 188.

#### RESORCINUM, $C_6H_4(OH)_2$ .

**Resorcin.** Meta-dioxybenzol.

A diatomic phenol. It should be kept in dark amber-colored vials.

It occurs in the form of colorless, or faintly reddish, needle-shaped crystals, or rhombic plates, having a faint, peculiar odor, and a disagreeable, sweetish, and afterwards pungent taste. Soluble, at 15° C., in 1.6 part of water, and in 0.5 part of alcohol; also soluble in ether, or glycerin. An aqueous solution has a neutral reaction.

Dose: 0.06–0.18 Gm. gr. j–iij.

#### ACTION.

Resorcin is anti-fermentative, antiseptic, analgesic, antipyretic, and sometimes caustic in action. In all these points it resembles carbolic acid. Weak solutions harden the skin; strong solutions macerate, and destroy it.

#### USE.

Locally, it is used upon the face, to promote peeling of skin in the treatment of acne rosaceæ—a 10 to 50 per cent. ointment, or paste. It is also used in other forms of skin disease.

Internally, it is used for its anæsthetic, and antiseptic, action in the treatment of gastritis, gastric ulcers, etc.

#### Φ HYDROQUINONE. $C_6H_6O_2$ .

**Para-dioxy-benzene.**

This is isomeric with resorcin. It occurs in long, colorless, odorless crystals, which have a sweetish taste, and melt at 169° C. (336° F.). Soluble in about 17 parts of cold water; freely soluble in hot water, alcohol, and ether.

Prepared by the oxidation of aniline, with potassium bichromate, and sulphuric acid.

Dose: 0.06–0.18 Gm. gr. j–iij.

#### ACTION.

This has the general action of resorcin.

## USE.

Quite similar to that of resorcin, internally.

**PYROGALLOL.**  $C_6H_3(OH)_3$ .**Pyrogallic Acid.**

A triatomic phenol, obtained chiefly by the dry distillation of gallic acid. It should be kept in dark amber-colored bottles.

It occurs as light, white, shining laminæ, or as fine needles; odorless, having a bitter taste, and a neutral or slightly acid reaction. Soluble, at  $15^\circ C.$ , in 1.7 parts of water, and in 1 part of alcohol.

## ACTION.

Locally, irritant, caustic, and parasiticide; a doubtful antiseptic. It is not safe for internal administration, and its local use may be followed by absorption, and toxic symptoms.

## USE.

Pyrogallol may be used in the treatment of certain skin diseases, as a 10 to 20 per cent. ointment.

## TOXICOLOGY.

The symptoms of poisoning are, vomiting, and diarrhœa; high temperature, black, and acid urine containing an abundance of globulin; collapse, and death.

*Treatment.*—Discontinue the drug, and treat symptoms.

**NAPHTALINUM.**  $C_{10}H_8$ .**Naphtaline.** Naphtalene.

A hydro-carbon, obtained from coal tar. It should be kept in well-stoppered bottles.

It occurs in colorless, shining, transparent laminæ, having a strong characteristic odor resembling that of coal tar, and a burning, aromatic taste; slowly volatilized on exposure to air. Insoluble in water; soluble in 15 parts of alcohol, at  $15^\circ C.$ ; also in ether, chloroform, volatile, and fixed oils. Its reaction is neutral. Its vapor is inflammable.

Dose: 0.12–0.30 Gm. gr. ij–v.

## ACTION.

Locally, and along the lines of elimination, naphtalin has an antiseptic, and irritant action. Elimination takes place through the respiratory, the intestinal, and the urinary tract. Large doses of naphtalin are poisonous. The toxic symptoms produced are those common to many of the coal-tar products, namely; a tendency to collapse. In large, but non-toxic doses,

there may be considerable irritation produced throughout the urinary tract; this is shown by frequent micturition with burning pain, vesical tenesmus, and dark-colored urine.

#### USE.

This drug has been used locally in the treatment of parasitic skin diseases (a 5 to 10 per cent ointment).

Internally, it may be used as an intestinal antiseptic, in the treatment of summer diarrhœa, typhoid fever, and dysentery; also as an anthelmintic, to cause the expulsion of the tapeworm, or round worms.

### NAPHTOL. $C_{10}H_7OH$ .

#### Beta-naphtol.

This is a phenol occurring in coal tar, but usually prepared artificially from naphthalin. It should be kept in dark amber-colored, well-stoppered bottles.

It occurs in colorless, or pale buff-colored, shining, crystalline laminæ, or as a white, or yellowish-white, crystalline powder, having a faint, phenol-like odor, and a sharp, pungent, but not persistent taste. Permanent in the air. Soluble, at  $15^{\circ}C$ ., in 1000 parts of water and in 0.75 parts of alcohol; soluble in about 75 parts of boiling water; soluble in ether, chloroform, etc. Its reaction is neutral.

Dose: 0.12–0.30 Gm. gr. ij–v.

#### ACTION.

Naphtol has the general action of naphthalin, but is less irritant, and less toxic.

#### USE.

This drug is superior to naphthalin as a therapeutic agent, and may be used by preference, for those conditions referred to under naphthalin.

$\phi$  **Hydro-naphtol** is quite similar to, if not identical with, naphtol.

Dose: 0.12–0.60 Gm. gr. ij–x.

$\phi$  **Naphtol-aristol**. Di-iod-beta-naphtol. A product of iodine, *B*-naphtol, and sodium carbonate. It is a greenish-yellow substance; odorless, and tasteless. Insoluble in water; sparingly soluble in ether, alcohol, or acetic acid. For external use.

$\phi$  **Sodium-naphtol**. Microcidin. Prepared by melting *B*-naphtol with half its weight of sodium hydrate, and allowing it to cool. It occurs as a whitish powder, soluble in 3 parts of water.

Dose: 0.12–0.60 Gm. gr. ij–x.

$\phi$  **Benzo-naphtol**. *B*-naphtol benzoate. This is analogous to betol. See p. 203. Prepared by the action of benzoyl chloride on *B*-naphtol. It occurs in long needle-like crystals, or as a white crystalline powder; odor-

less and tasteless. Insoluble in water. In the intestinal canal it is split up into its constituents.

Dose: 0.12-0.60 Gm. gr. ij-x.

#### ACTION AND USE.

These derivations of naphthol have the general action, and uses, of naphthalin, and naphthol. Certain advantages, not yet established, have been claimed for each one.

#### Φ METHYLENE BLUE. $C_{16}H_{18}N_2Scl$ .

##### **Tetra methylin-chloride.**

This occurs in small, scaly, indigo-colored crystals, with a bronze-like tinge. It is soluble in water and alcohol; odorless, and tasteless.

Dose: 0.03-0.12 Gm. gr.  $\frac{1}{2}$ -ij. Daily dose: 0.18-0.60 Gm. gr. iij-x.

#### ACTION.

A staining agent; an analgesic, and an antiseptic. It may cause slight irritation at the point of application, and along the lines of elimination.

#### USE.

It may be used locally as an antiseptic (1 to 10 per cent. volume).

It has been used for its analgesic action in neuralgia, rheumatism, etc. By some it is considered of marked benefit as an antiperiodic, promptly destroying the *plasmodium malariae*; others consider it worse than useless. It has also been used in the treatment of chyluria, due to the presence of the *Filaria sanguinis hominis*. It has been used in the treatment of gonorrhœa, both internally, and by injection.

Its property of coloring everything blue with which it comes in contact is sometimes a disadvantage. In the case of a pregnant woman to whom the drug was administered the amniotic fluid was discolored, and the urine of the child remained blue for at least four days after birth.

Methyl-blue is often substituted for methylene-blue, and *v. v.*

#### Φ METHYL BLUE.

##### **Methyl Violet. Blue pyoktanin.**

This is one of the aniline dyes. It occurs in the form of an odorless powder. It may also be obtained as crayons of various shapes, and sizes.

Dose: 0.03-0.12 Gm. gr.  $\frac{1}{2}$ -ij. Daily dose: 0.06-0.60 Gm. gr. i-x.

#### ACTION.

Methyl blue is antiseptic, and analgesic. It has the disadvantage of staining everything with which it comes in contact. (The stain may be removed by washing the part with soap, and afterwards with alcohol.) It



does not coagulate albumin. Undiluted it acts as an irritant. Large doses internally have a sedative effect on both motor, and sensory nerves. It is not so active a germicide as is carbolic acid.

#### USE.

This drug has no established place in therapy. It may be used as a local antiseptic (1 in 1000) in surgical practice, and in the treatment of parasitic skin diseases. It may be used in the treatment of gonorrhœa, both by injection (1 in 3000), and by internal administration. It has been highly praised for use in the treatment of malignant growths, by hypodermatic injections into, or at the side of, the growth.

Methylene blue is often substituted for methyl-blue and *v. v.*

### CREOSOTUM.

#### Creosote.

A mixture of phenols, chiefly guaiacol and creosol, obtained during the distillation of wood-tar, preferably of that derived from the beech, *fagus sylvatica* (Nat. ord., *Cupuliferæ*).

An almost colorless, yellowish, or pinkish, highly refractive, oily liquid, having a penetrating, smoky odor, and burning, caustic taste; usually becoming darker in tint, on exposure to light. Sp. gr.: not below 1.770, at 15° C. Soluble in about 150 parts of water, at 15° C., but without forming a perfectly clear solution; soluble in all proportions, in absolute alcohol, ether, chloroform, fixed, and volatile oils. Its reaction is neutral, or faintly acid. Most of it distils over between 205° and 215° C. (401°–419° F.).

#### PREPARATIONS.

Creosotum . . . . . 0.06–0.18 Cc. ℥j–ij.

Aqua Creosoti (1 per cent.) . . . . . 3.75–15.00 Cc. ℥i–iv.

#### ACTION.

Creosote has practically the action of carbolic acid. It is generally diluted with neutral wood oils so that it is not so strong as pure carbolic acid. It is more antiseptic than carbolic acid of the same strength; less antiseptic than “coal tar creosote.” Internally, it is apt to cause gastric irritation.

#### USE.

Creosote is seldom used externally. It is used by the dentist in cleansing, and dressing cavities.

It may be used by inhalation alone, or in combination with other volatile antiseptics, in the treatment of chronic laryngitis—tubercular, or non-tubercular,—in chronic bronchitis, and in pulmonary tuberculosis. Internally, it may be used in the treatment of pulmonary tuberculosis.

## Φ CREOSOTAL.

**Creosote Carbonate.**

This is an amber-colored, viscid, oily liquid, becoming more fluid upon warming. It is neutral in reaction, and odorless, with a faint, sweetish taste of creosote. Insoluble in water, but soluble in alcohol, ether, and chloroform. Sp. gr.: 1.165, at 15° C.

Obtained by the action of carbon-dioxide on beech-wood creosote.

Dose: 0.30–0.60 Cc. ℥ v–x.

## ACTION.

That of creosote. It does not cause gastric irritation even when administered in large doses. It is said to be decomposed in the intestinal canal into carbon dioxide, and creosote.

## USE.

This may be used instead of creosote in the treatment of pulmonary tuberculosis. Also as a gastric, and intestinal, antiseptic.

Φ GUAIACOL.  $C_6H_4OHOCH_3$ .**Methyl-pyro-catechin.**

This is a liquid compound said to constitute from 60 to 90 per cent. of beech-wood creosote.

It is colorless, with an agreeable odor, and a not-unpleasant taste. Soluble in 85 parts of water; soluble in alcohol, ether, and fixed oils. Sp. gr.: 1.133.

Obtained by fractional distillation of beech-wood creosote; the fraction passing over between 200° and 205° C. (392° to 401° F.), being collected and purified.

Dose, 0.30–0.60 Cc. ℥ v–x.

## ACTION.

This preparation has the general action of creosote. It does not cause gastric irritation.

## USE.

Guaiacol has been introduced as a substitute for creosote in the treatment of pulmonary tuberculosis, and as an intestinal antiseptic. It has the advantage of a definite chemical nature.

Φ GUAIACOL CARBONAS.  $(C_6H_4OCH_3)_2CO_2$ .**Guaiacol Carbonate.**

This is a white, neutral, crystalline powder; nearly odorless, and tasteless. Insoluble in water; soluble in alcohol, ether, and chloroform. Its melting point is 86° to 90° C. (186.8° to 194° F.).

Dose, 0.30–0.60 Gm. gr. v–x.

## ACTION.

That of guaiacol. It is said to be decomposed in the intestinal canal into carbon dioxide, and guaiacol.

## USE.

This preparation is generally considered superior to guaiacol, or creosote, in the treatment of pulmonary tuberculosis, or as an intestinal antiseptic.

**BENZOSOL.**  $C_6H_4OHC_6H_5CO_2$ .**Guaiacol Benzoate.** Benzoyl-guaiacol.

This is a colorless, crystalline powder; almost odorless, and tasteless. Insoluble in water, but soluble in hot alcohol, ether and chloroform.

Obtained by the formation of a potassium salt, from pure guaiacol; also by the interaction of guaiacol with benzoic anhydride. It contains 54 per cent. of guaiacol.

Dose, 0.30–0.60 Gm. gr. v–x.

## ACTION.

Benzosol depends upon the guaiacol that it contains for its action; the guaiacol is set free by the alkaline secretions of the intestinal canal. Its advantage over guaiacol is, its being tasteless, not disturbing digestion, or causing disagreeable eructations.

## USE.

The same as that of guaiacol carbonate.

**ACIDUM SALICYLICUM.**  $HC_7H_5O_3$ .**Salicylic Acid.**

An organic acid, existing naturally, in combination, in various plants, but most largely prepared synthetically from carbolic acid.

It occurs as light, fine, white, prismatic needles, or as a light, white, crystalline powder; odorless, having a sweetish, afterwards acrid taste, and an acid reaction. Permanent in the air. Soluble, at 15° C., in 450 parts of water, and in 2.4 parts of alcohol; soluble in ether, and chloroform.

Dose, 0.30–0.60 Gm. gr. v–x.

## ACTION.

Salicylic acid is irritant, antiseptic, parasiticide, anti-periodic, antipyretic, and anti-rheumatic. It has also the property of softening the epidermis. Its irritant properties are apparent locally; or in the stomach, causing nausea and vomiting; or along the lines of elimination; causing albuminuria, redness, and itching of the skin.

It enters the circulation as a salicylate, but a portion of the acid is again set free and is eliminated by the kidneys, the skin, the salivary glands, and other secretions. A part of the acid is eliminated in the urine unchanged; a part is converted into salicyluric acid ( $\text{HC}_9\text{H}_8\text{NO}_4$ ).

Its antiseptic action is somewhat more marked than that of carbolic acid, and may be secured both locally, and along the lines of elimination. Its anti-periodic properties are probably dependent on its action as an antiseptic; they are not so marked as those resulting from the use of quinine.

Like other antipyretics of the group of carbon compounds, salicylic acid probably reduces temperature by diminishing heat production, and, to a certain degree, increasing heat elimination.

It has a specific action in relieving the pain, and reducing the temperature, of rheumatic fever. The salicylic compounds all increase the excretion of uric acid, and this may explain their action as anti-rheumatics.

### USE.

Although an active antiseptic, it is not a convenient antiseptic for general use. It has a prominent place in the treatment of certain sub-acute and chronic skin diseases; in part for its antiseptic action; in part for its property of softening epidermic growths, and favoring, through stimulation, the normal epithelial proliferation; 2 to 5 per cent. is the usual strength for ointment, dusting powder, or plaster. It may also be used internally in the treatment of certain forms of skin diseases.

In the treatment of rheumatic fever, salicylic acid has a prominent place, for, through its action, the pain is quickly relieved, the temperature reduced, and the disease possibly shortened. The quantity of the drug to be administered is regulated by the tolerance of the patient. The daily dose must be large, and must be continued for some time after the pain and fever have disappeared, in order to prevent a relapse. Salicylic acid may be used locally with apparently as good results as those which follow its internal administration, and without causing so much disturbance of the nervous system, or of the stomach. An ointment containing oil of turpentine, 10 parts, salicylic acid, 10 parts, and lanolin, 80 parts, is a suitable one for applying to the affected joints, which should then be wrapped in flannel. The absorption of the acid is rapid, as shown by its speedy appearance in the urine. In muscular rheumatism, salicylic acid may also give relief. In tonsillitis, especially when of the rheumatic type salicylic acid is almost a specific. In gastric dyspepsia, due to the decomposition of food, salicylic acid, prescribed after meals, may be of marked benefit.

### TOXICOLOGY.

An overdose of salicylic acid gives rise to ringing in the ears, partial

or total deafness, disturbed vision, headache, and diminished reflexes; the functions of the heart and lungs become greatly depressed; the pulse becomes weak and irregular; the respirations become feeble, and death may occur from paralysis of respiration. The urine has a dark-green color, due to the presence of indican, or pyrocatechin. There may be albuminuria, hæmaturia, or suppression of urine.

The toxic symptoms are more apt to occur after the use of a synthetically prepared acid than after the use of an acid obtained from the oil of wintergreen, or of sweet birch.

*Treatment.*—Discontinue the drug, and treat the untoward symptoms as they arise.

### THE SALICYLATES.

*General Action.*—With the salicylates the local action of salicylic acid is wanting, but the constitutional action remains. Or, to put it more properly, the constitutional action, described as that of salicylic acid, is really that of the salicylates, for salicylic acid enters the system only after conversion into a salicylate. With their use there is some gastric irritation; a tendency to free perspiration; a reduction of temperature in case pyrexia is present; and, a sense of fulness of the head, or even headache, with some ringing in the ears, as described under salicylic acid. Salicylic acid can be detected in the urine, the sweat, and the saliva, soon after the ingestion of a salicylate. In over-doses the salicylates will produce the toxic symptoms described under salicylic acid, but to a less marked degree.

#### PREPARATIONS.

Methyl Salicylas . . . . .	0.30–0.95 Cc. ℥v–xv.
Oleum Gaultheriæ . . . . .	0.30–0.95 Cc. ℥v–xv.
Oleum Betulæ Volatile . . . . .	0.30–0.95 Cc. ℥v–xv.
Sodii Salicylas . . . . .	0.60–1.25 Gm. gr. x–xxx.
Lithii Salicylas . . . . .	0.30–0.95 Gm. gr. v–xv.
Physostigminæ Salicylas . . . . .	See Physostigma.

#### METHYL SALICYLAS. $\text{CH}_3\text{C}_7\text{H}_5\text{O}_3$ .

**Methyl Salicylate.** Artificial (or synthetic) oil of wintergreen.

It should be kept in well-stoppered bottles, protected from light.

It is a colorless, or slightly yellowish liquid, having the characteristic, strongly aromatic odor, and the sweetish, warm, and aromatic taste of oil of gaultheria. Sp. gr.: 1.183 to 1.185, at 15° C. Soluble in all proportions in alcohol. The alcoholic solution is neutral, or slightly acid.

#### ACTION.

This has the general action described for the salicylates.



## USE.

It may be used internally, alone, or in combination with other salicylates, or with salicylic acid, for the constitutional action of salicylic acid, or of the salicylates.

**OLEUM GAULTHERIÆ.**

**Oil of Gaultheria.** Oil of wintergreen.

A volatile oil distilled from the leaves of *Gaultheria procumbens* (Nat. ord. : *Ericaceæ*) consisting almost entirely of methyl salicylate, and nearly identical with the volatile oil of betula.

It should be kept in well-stoppered bottles, protected from light.

It is a colorless, or yellow, or occasionally reddish liquid, having a characteristic, strongly aromatic odor, and a sweetish, warm, and aromatic taste. Sp. gr. : 1.175 to 1.185, at 15° C.

**Spiritus Gaultheriæ.** Spirit of gaultheria is a 5 per cent. alcoholic solution of oil of gaultheria.

**OLEUM BETULÆ VOLATILE.**

**Volatile Oil of Betula.** Oil of sweet birch.

It should be kept in well-stoppered bottles, protected from light.

A volatile oil obtained by distillation from the bark of *Betula lente* (Nat. ord. : *Betulaceæ*). It is identical with methyl salicylate, and nearly identical with oil of wintergreen.

It has the same properties and conforms to the same reactions as methyl salicylas. See p. 199.

## ACTION.

These two oils and their preparations have the general action of the salicylates. They are less likely to produce unpleasant symptoms than is the synthetically prepared methyl salicylate.

## USE.

This conforms to the internal use of salicylic acid. See p. 198.

**SODII SALICYLAS.**  $\text{NaC}_7\text{H}_5\text{O}_8$ .

**Sodium Salicylate.**

It should be kept in well-stoppered bottles, protected from heat, and light.

A white, amorphous powder ; odorless, having a sweetish, saline taste, and a slight acid reaction in aqueous solution. Permanent in cool air. Soluble, at 15° C., in 0.9 part of water, and in 6 parts of alcohol ; soluble in glycerin.

Prepared by mixing 100 parts of salicylic acid, made into a paste with water, with 104 parts of sodium carbonate ; carbon dioxide will be evolved, and sodium salicylate will remain.

## ACTION.

The sodium salicylate has no local antiseptic action, but when used internally the test for salicylic acid will reveal its presence in the urine, saliva, sweat, etc., and an antiseptic action is thus present along the lines of elimination.

It may cause some disturbance of the nervous system, as shown by the ringing in the ears produced, but there is no such marked depression as that produced by salicylic acid. Its irritant action is not marked, except when large and continued doses are used. Its antipyretic action is very pronounced, and is probably due to both diminished heat production, and increased heat dissipation. Very profuse diaphoresis results from continued antipyretic doses.

It (like salicylic acid) has a specific action in relieving the pain, and reducing the temperature, of acute inflammatory rheumatism.

It seems to increase the secretion of bile, and at the same time make it more liquid in character.

## USE.

Sodium salicylate is a favorite salicylate for use in the treatment of those conditions calling for the internal use of salicylic acid. In other words; when the constitutional action of the salicylates is wanted, or when the action of salicylic acid is wanted along the lines of elimination.

**LITHII SALICYLAS.**  $\text{LiC}_7\text{H}_5\text{O}_3$ .**Lithium Salicylate.**

It should be kept in well-stoppered bottles.

It is a white, or grayish-white powder; odorless, having a sweetish taste, and a slightly acid reaction in aqueous solution. It is deliquescent on exposure to the air; very soluble in water, and in alcohol.

It may be prepared by adding to a mixture of 11 parts of salicylic acid, and 3 parts of lithium carbonate, 25 parts of water; then heating until effervescence ceases, filtering, and evaporating the product.

## ACTION.

Lithium salicylate has an action similar to that of the sodium salt, with the theoretical advantage that may be derived from lithium salts in rheumatic, or gouty cases.

## USE.

This salt has but little therapeutic use, as the sodium salt can practically fulfill all of its requirements.

**SALICINUM.**  $\text{C}_{18}\text{H}_{18}\text{O}_7$ .**Salicin.**

A neutral principle obtained from several species of *Salix* and *Populus* (Nat. ord.: *Salicaceæ*).

It occurs in colorless, or white, silky, shining crystalline needles, or as a crystalline powder; odorless, having a bitter taste and a neutral reaction. Permanent in the air. Soluble, at  $15^{\circ}\text{C.}$ , in 28 parts of water, and in 30 parts of alcohol.

Dose: 0.60–1.25 Gm. gr. x–xx.

#### ACTION.

Salicin has the general action of salicylic acid. It is one of the sources of salicylic acid. It is decomposed in the body, and is eliminated partly as salicylic acid, and partly (in the urine) as salicyluric acid.

#### USE.

Salicin is but little used now. It has been displaced by salicylic acid, and the salicylates.

**SALOL.**  $\text{C}_6\text{H}_5\text{C}_7\text{H}_5\text{O}_3$ .

#### Phenyl Salicylate.

A white crystalline powder; odorless, or having a faintly aromatic odor, almost tasteless, and having a neutral reaction. Almost insoluble in water; soluble in 10 parts of alcohol, at  $15^{\circ}\text{C.}$ ; soluble in ether, chloroform, fixed, or volatile oils.

Prepared by heating salicylic acid, or a salicylate, with phenol in the presence of phosphorus pentachloride, or oxychloride. It is composed of 40 per cent. carbolic acid and 60 per cent. salicylic acid.

Dose: 0.30–0.60 Gm. gr. v–x.

#### ACTION.

Salol is antiseptic, antipyretic, analgesic, and toxic, to a greater degree than is salicylic acid, or the salicylates. The toxic action is that of carbolic and salicylic acid combined. It has an advantage in the intestinal canal as an antiseptic because decomposition takes place here, it being resolved into salicylic and carbolic acid. Its antiseptic action is apparent along the lines of elimination—the urinary tract, the salivary tract, etc.,—as well as throughout the intestinal canal. While possessing anti-rheumatic properties, its toxic qualities make it unsafe for such use.

#### USE.

It may be used locally as a deodorant and antiseptic dressing for ulcers, burns, etc. (a 3 per cent. dusting powder, or ointment). Internally, it is used for its antiseptic action in certain forms of diarrhoea, or dysentery, and in typhoid fever. It is a useful drug in the treatment of muscular rheumatism, but not suitable for use in rheumatic fever.

Φ **SALOPHEN.**  $C_6H_4(OH)CO_2C_6H_4NHCOCH_3$ .

### Acetyl-para-amido-salol.

This occurs as minute white scales, containing about 51 per cent. of salicylic acid. It is odorless and tasteless; insoluble in cold water; sparingly soluble in hot water, and freely soluble in alcohol, ether, and alkaline solutions.

The process of preparing this is a complicated one. While the product resembles salol, the carbolic acid element has been replaced by a comparatively harmless phenol.

Dose: 0.30–0.60 Gm. gr. v–x.

#### ACTION.

Like that of salol, but safer.

#### USE.

The same as that of salol.

Φ **BETOL.**  $C_{10}H_7C_7H_5O_3$ .

### Naphtalol. Naphtosalol. Salinaphtol.

A crystalline compound, with the composition of *B*-naphtol salicylate, and closely allied to salol.

It occurs as a colorless, lustrous, crystalline powder; odorless and tasteless. Insoluble in water or glycerin; sparingly soluble in alcohol. Split up by the alkaline pancreatic secretion, in the intestinal canal, into *B*-naphtol, and salicylic acid.

Prepared by heating together a mixture of *B*-naphtol, sodium salicylate, and phosphoric chloride; besides betol, sodium meta-phosphate, and sodium chloride are formed.

Dose: 0.30–0.60 Gm. gr. v–x.

#### ACTION.

Quite similar to salol, but less effective because of its higher melting point, greater stability, and more marked insolubility.

#### USE.

The same as that for salol, with no advantages.

Φ **DIURETIN.**  $C_7H_7NaN_4O_2C_7H_5O_3Na$ .

### Sodio-theobromine Salicylate.

A definite double compound of sodium theobromine, and sodium salicylate.

It occurs as a white powder; odorless, with a saline, alkaline taste; soluble with the aid of heat, in less than half its weight of water.

It is very unstable, and is decomposed by all acids, even by the carbonic-acid gas present in the atmosphere.

It should contain about 50 per cent. of theobromine, and about 38 per cent. of salicylic acid.

Dose: 0.60–1.25 Gm. gr. x–xx.

#### ACTION.

That of a diuretic, and cardiac stimulant. Whether this action is due in part to the effect of the drug upon the circulation, or only to stimulation of the secreting epithelium of the kidney, is not yet determined. It has the stimulating action of theobromine upon the heart.

#### USE.

In dropsy, due to cardiac disease, especially when calomel, digitalis, strophanthus, etc., have failed to give relief. It has been used in dropsy, due to renal disease, but without much benefit.

#### Φ PIPERAZINE. $C_4H_{10}N_2$ .

**Diethylene-diamine.** Ethylenimine. Piperazidine.

Formed by the action of ammonia on ethylene bromide, or chloride.

It occurs in the form of lustrous crystals, almost tasteless. Very soluble in water. Very unstable. It absorbs moisture, and carbon dioxide, from the atmosphere, and liquefies in so doing.

Dose: 0.30–0.95 Gm. gr. v–xv.

#### ACTION.

This is not well understood. It is supposed to have a marked solvent action upon uric acid, and concretions of urates. Experiments tend to show, however, that while relief may be obtained in cases due to faulty excretion of urates, it does not appear to increase the excretion of uric acid, or of urea. It may sometimes increase the amount of urine excreted. It is possible that the action of this drug may be due to increased oxidation in the tissues, thus increasing the formation of urea.

#### USE.

In the treatment of renal calculus, and of gravel; also, in the treatment of gout. In this latter disease, because of the diminished alkalinity of the blood, it may be well to have the patient on an alkaline treatment in connection with this use of piperazine. Thus: Potassium citrate, 1.90 Gm., ( $3\frac{1}{2}$ ) with each dose of piperazine.

#### TOXICOLOGY.

The continued use of large doses of piperazine will produce a feeling of nervousness, and apprehension; a dazed condition; inability to think clearly; uncontrollable hallucinations, and delusions; delirium, or partial unconsciousness. There may be intermittent muscular spasms, muscular prostration, with inco-ordination.



*Treatment.*—Discontinue the drug and treat the symptoms that require attention.

**ACETANILIDUM.**  $C_6H_5NH, C_2H_5O$ .

**Acetanilid.** Phenyl acetamide. Antifebrin.

An acetyl derivative of aniline.

It occurs as white, shining, micaceous, crystalline laminæ, or as a crystalline powder; odorless, having a faintly burning taste, and an acid reaction. Permanent in the air. Soluble, at  $15^{\circ} C.$ , in 194 parts of water, and in five parts of alcohol.

Dose: 0.18–0.36 Gm. gr. iij–vi.

**ACTION.**

Acetanilid is antipyretic, mildly anæsthetic, analgesic, hypnotic, hæmostatic, desiccant, antiseptic, and, to a slight extent, germicidal. Its antipyretic action is due to diminished heat production and increased heat dissipation. The blood is not altered by small doses, but large or continued doses may result in the formation of met-hæmoglobin, and marked interference with oxygenation. There is no appreciable effect on the heart from small doses, but large or continued doses cause cardiac depression. Its hæmostatic properties are due to the blood changes produced—increased consistency without increased coagulability—and to contraction of the blood-vessels. Medicinal doses lessen reflex activity, and exercise a sedative action upon the nervous system. Diaphoresis is often present; this may be preceded by a chill. Acetanilid may cause the appearance of an eruption, resembling that of measles, upon the body. There may also be intense itching.

From a laboratory, and probably from a clinical point of view, it is far superior to iodoform, as an antiseptic, or germicide, and its substitution for iodoform seems warrantable.

**USE.**

Locally, acetanilid may be used as an anæsthetic, and as an antiseptic dressing.

Internally, if used with discretion, it may be prescribed at times to reduce body temperature, in febrile condition. It, however, should not be used in any asthenic, nor in many sthenic, febrile conditions; in fact, it would be no great loss if the use of this drug, purely for its antipyretic action, was entirely done away with.

It may be used to relieve the pain attending rheumatic fever, but it has no curative action, and is in no way the equal of salicylic acid, or the salicylates, in this disease. The chief value of this drug, for internal administration, depends upon its analgesic action; but even here it must be avoided when there is a tendency to much depression.

## TOXICOLOGY.

In large doses this drug causes symptoms of cyanosis. There is also excessive depression of temperature; profuse perspiration, beginning about the head, and gradually extending over the body; a feeble pulse. The respirations are slow, and shallow; the blood corpuscles are disorganized; the urine is diminished in quantity, and dark colored, from the presence of coloring matter from the blood. Death may occur from cardiac or respiratory failure.

*Treatment.*—This should consist in the use of simulants: Strychnine, for its action upon the heart and respiration; belladonna, for its effect on arterial tension; external heat; the inhalation of oxygen; etc.

Φ **Salicybromanilide**. Salbromalide. Antinervine. A mixture of ammonium bromide, salicylic acid and acetanilid, in the proportions of 1.1, and 2.

Dose: 0.18–0.36 Gm. gr. iij–vj.

Φ **Methacetine**.  $C_6H_4OCH_3, NHCH_3CO$ . Para-acetanilid. This is in the form of lustrous, colorless, scaly crystals; odorless. Sparingly soluble in cold water; soluble in alcohol, glycerin, chloroform, and fatty oils.

Dose: 0.18–0.36 Gm. gr. iij–vj.

Φ **Exalgine**.  $C_6H_5N(CH_3)CH_3CO$ . Methyl-acetanilid. It occurs in acicular needles; odorless, and tasteless. Sparingly soluble in cold water; soluble in alcohol.

Dose: 0.18–0.36 Gm. gr. iij–vj.

## ACTION.

Salicyl-bromanilide, and methacetine, were supposed to have advantages over acetanilid, so far as its action upon the heart, and blood is concerned. They have not established the claim.

Exalgine was expected to take a prominent place as an analgesic. It, however, has a marked toxic action, resembling that of carbolic acid, and should be used with extreme care. It has no antipyretic action when used in medicinal doses.

Φ **PHENACETINUM**.  $C_6H_4OC_2H_5NHCH_3CO$ .

**Phenacetin.**

It occurs in colorless, glistening, scaly crystals; odorless, and tasteless. Sparingly soluble in 16 parts of alcohol.

Obtained from sodium para-nitrophenol, by the action of ethyl iodide, and glacial acetic acid.

Dose, 0.18–0.36 Gm. gr. iij–vj.

## ACTION.

Phenacetin has the general action of acetanilid, but is less disposed

to produce unpleasant effects upon the heart, and circulation, than its companion drug.

#### USE.

As an antipyretic in certain febrile conditions. As an analgesic in neuralgia, headache, etc.

Φ **ANTIPYRIN.**  $C_{11}H_{12}N_2O$ .

#### **Phenazonum** (B. P.).

This is a derivative of coal tar.

It occurs in scaly crystals; odorless, with a somewhat bitter taste. Soluble in water, alcohol, and chloroform.

Prepared by a patented process. Knorr's patent.

Dose, 0.30–1.25 Gm. gr. v–xx.

#### ACTION.

Antipyrin resembles acetanilid in its general action; in addition, it may cause nausea, and vomiting.

#### USE.

Locally it may be used as a hæmostatic, or analgesic (4 per cent. solution). Sometimes it is combined with cocaine, as their local action has some points in common. For internal use it has given way to acetanilid, and phenacetin.

Φ **SALIPYRIN.**

#### **Antipyrin Salicylate.**

This is a white, coarsely crystalline powder; odorless, with a rough, but not unpleasant, sweetish taste. Sparingly soluble in water, and in ether; soluble in alcohol.

Dose, 0.30–1.25 Gm. gr. v–xx.

#### ACTION.

Salipyrin is supposed to resemble antipyrin and acetanilid in action, with freedom from cardiac influence.

#### USE.

If used at all it is as a substitute for antipyrin, or acetanilid.

Φ **SACCHARIN.**  $C_6H_4\left\{\begin{smallmatrix} CO \\ SO_2 \end{smallmatrix}\right\}NH$ .

#### **Gluside.** Glucosimide.

It occurs as a white powder, having an intensely sweet taste (300 times sweeter than sugar), and a slight, aromatic odor. Sparingly soluble in water; soluble in alcohol, glycerin, ether, and in a solution of sodium bicarbonate. Its aqueous solution has an acid reaction, and forms salts.

It is prepared from toluol—a product of coal tar.

Dose, 0.06–0.60 Gm. gr. i–x.

## ACTION.

Antiseptic. It retards the action of digestive ferments and may thus impair nutrition. It is eliminated largely by the kidneys and its antiseptic action is apparent throughout the urinary tract. Its chief value is simply to replace sugar when sugar for any reason is contraindicated.

## USE.

As a sweetening agent where sugar is proscribed, as in diabetes mellitus. As an antiseptic, in cystitis.

**Desoxyalizarin.**

It occurs as a yellowish white powder. Insoluble in water, and in dilute acids; sparingly soluble in chloroform; freely soluble in alcohol, and glycerin.

A phenol derivative, allied to chrysarobin.

## ACTION.

That of chrysarobrin, *i. e.*, a local stimulant, and parasiticide. It has the advantage over chrysarobin of being non-irritant, and not producing a stain. At the same time it has been characterized, by some, as perfectly worthless.

## USE.

Locally, in some forms of chronic skin diseases—psoriasis, etc.—as an ointment, 5 to 10 per cent.

## PART VI.

### THE ANIMAL KINGDOM.

#### Φ HIRUDO.

##### Leech.

The *Sanguisuga medicinalis* and *Sanguisuga officinalis* (class, *Vermes*; order *Annelida*; sub-order, *Apoda*; family *Hirudinea*).

The body of the *S. medicinalis* is 75 to 150 Mm. (3 to 6 inches) long, and weighs from 1 to 5 Gm. (15 to 75 grains). It is smooth, soft, round, somewhat flattened, tapering towards both ends, and made up of from 75 to 100 soft rings, or folds. Both ends are provided with a flattened disc, the posterior being the larger, each of which is adapted to fix upon objects by suction. In the centre of the anterior disc is the mouth, containing three jaws, each with a double row of fine, sharp teeth. Color of back, olive green or blackish green, with longitudinal stripes dotted with black; the belly is a somewhat lighter green.

*Habitat*.—Found more or less in all parts of Europe, but chiefly in the northern part, in ponds of fresh water.

*Preservation*.—Place the leeches in a vessel containing clear water at a temperature of 10° to 20° C. (50°–80° F.). Have some charcoal, moss, and pebbles, in the vessel. Keep it in a shaded place. The water should be changed at least once a week.

#### USE.

For local blood-letting; a healthy leech will draw from 2 to 8 Gm. ( $3\frac{1}{2}$  to 2) of blood, and as much more will flow after the leech has fallen off. Leeches gorged with blood should be kept by themselves, and not used for six months, or more.

##### Hirudo decora.

The American leech. This one is sometimes employed. Its back is a dark-green color, marked with one row of orange brown, and two lateral rows of black spots. The belly is of a light orange-brown color, spotted with black.

#### COCCUS.

##### Cochineal.

The dried female of *Coccus cacti* (class, *Insecta*; order, *Hemiptera*).



They are about 5 mm. ( $\frac{1}{2}$  an inch) long ; of a purplish-gray, or purplish-black color ; nearly hemispherical. They yield a dark-red powder. Odor, faint ; taste, bitter.

Chief constituent. Carminic acid.

Dose, 0.06–0.95 Gm. gr. i–xv.

#### ACTION.

Diuretic, stimulant, antispasmodic.

#### USE.

Chiefly used as a coloring agent.

### CANTHARIS.

**Spanish Fly.** *Cantharides*.

The *Cantharis vesicatoria* (class, *Insecta* ; order, *Coleoptera*).

They should be thoroughly dried at a temperature not to exceed 40° C. and kept in a well-closed vessel, containing a little camphor.

They are about 25 Mm. (1 inch) long, 6 Mm. ( $\frac{1}{4}$  inch) broad, with transparent brownish wings ; elsewhere of a shining coppery green color. The powder is grayish-brown, and contains green, shining particles ; odor strong, and disagreeable.

Chief constituent. Cantharidin.

#### PREPARATIONS.

Tinctura Cantharidis (5 per cent.) . . 0.06–0.30 Cc. M i–v.

Ceratum Cantharidis (32 per cent.) . . Blistering cerate.

Collodium Cantharidatum (60 per cent.). Blistering collodion.

Emplastrum Picis Cantharidatum (8 per cent.) . . . . . Warming plaster.

#### ACTION.

Locally, cantharis acts as an irritant, causing tingling, redness, and vesication.

Internally, cantharis acts as an irritant throughout the alimentary canal ; also along the line of elimination, throughout the urinary tract.

#### USE.

Externally, cantharis may be used as a counter-irritant, or as a local irritant, or rubefacient.

Internally, it may be used in small doses for its stimulating action throughout the urinary tract.

#### TOXICOLOGY.

A toxic dose of cantharis will cause acute inflammation throughout the urinary tract, as manifested by pain in the lumbar region ; a burning pain

in the bladder, and along the urethra, vesical tenesmus, acute nephritis, bloody urine diminished in quantity at first, and later suppressed. These symptoms may be produced by absorption of the drug during its local use. When taken internally there will also occur symptoms of marked gastro-enteritis.

*Treatment.*—Morphine to relieve the pain; copious drafts of warm water, followed by the free use of mucilaginous, or albuminous liquids. The fixed oils, and other substances that may dissolve the active principle of cantharis, should be avoided.

#### MEL.

##### Honey.

A saccharine secretion deposited in the honey comb by *Apis Mellifica* (honey-bee), (class, *Insecta*; order, *Hymenoptera*).

A syrupy liquid of a light yellowish to a pale yellowish-brown color, translucent when fresh, but gradually becoming opaque and crystalline; having a characteristic, aromatic odor, and a sweet, faintly acrid taste.

Chief constituents. Grape sugar, or dextrose; fruit sugar, or levulose; a little wax, proteids, volatile oil, mucilage, and formic acid.

**Mel Despumatum.** Clarified honey, with a little glycerin.

**Mel Rosæ.** Clarified honey, with fluid extract of rose.

#### ACTION.

Demulcent, laxative.

#### USE.

This has no prominent therapeutic use.

#### CERA FLAVA.

##### Yellow Wax. Bees-wax.

A peculiar concrete substance prepared by *Apis Mellifica* (honey-bee), (class, *Insecta*; order, *Hymenoptera*).

A yellowish to brownish-yellow solid, having an agreeable, honey-like odor, and a faint, balsamic taste. Sp. gr.: 0.952–0.967, at 15° C. Insoluble in water; sparingly soluble in cold alcohol; freely soluble in boiling alcohol, ether, chloroform, fixed, and volatile oils.

#### ACTION.

Protective.

#### USE.

This is used pharmaceutically, in preparing various cerates, plasters, and ointments.

#### CERA ALBA.

##### White Wax. Bees-wax.

A yellowish-white solid, having a slightly rancid odor, and an insipid

taste. Sp. gr.: 0.965 to 0.975, at 15° C. This is simply yellow wax bleached.

#### ACTION.

Protective.

#### USE.

Pharmaceutically, in various cerates, plasters, and ointments.

### ICHTHYOCOLLA.

**Isinglass.** Fish glue.

The swimming bladder of *Acipenser Huso*, and of other species of *Acipenser* (Sturgeons), (class, *Pisces*; order, *Sturiones*).

It occurs in separate sheets, sometimes rolled, of a horny or pearly appearance, whitish or yellowish, semi-transparent. Very soluble in boiling water. The solution in 24 parts of boiling water forms, on cooling, a transparent jelly. It is odorless, and almost tasteless.

To obtain it the swimming bladder is cut, washed, deprived of its outer layer, and dried.

#### ACTION.

Emollient, nutritive, protective.

#### USE.

It may be used as an article of diet during the treatment of certain diseases of the bowels. Isinglass plaster (court-plaster) is in very common use to protect slight cuts, and abrasions of the skin.

### OLEUM MORRHUÆ.

**Cod-Liver Oil.**

It should be kept in well-stoppered, and perfectly dry bottles.

A fixed oil obtained from the fresh livers of *Gadus Morrhua* (common cod fish) or of other species of *Gadus* (class, *Pisces*; order, *Teleostia*).

A colorless, or pale-yellow, thin, oily liquid, with a fishy odor, and taste, and a faintly acid reaction. Sp. gr.; 0.920–0.925, at 15° C. Sparingly soluble in alcohol; readily soluble in ether.

Chief constituents. Olein, palmitin, stearin, iodine, traces of chlorine, bromine, phosphorus, and sulphur; cholesterin, and other biliary compounds.

Dose, 3.75–7.50 Cc. ʒi–ij.

#### ACTION.

That of a food, due to the presence of fat in an easily digested form; it also has a tonic, and stimulating, action on nutritive processes, due to the small amount of iodine, bromine, etc., present.

## USE.

Cod-liver oil is a suitable food for use in the treatment of various chronic or wasting diseases, such as syphilis, neuralgia, chronic bronchitis, marasmus, tuberculosis, etc. Also during delayed, or tedious, convalescence after acute diseases, such as pneumonia, typhoid fever, measles, etc. It should be given two or three hours after meals. Where not well borne by the stomach, cod-liver oil may be used by inunction.

## Φ MORRHUOL.

A crystalline substance obtained from cod-liver oil, containing phosphorus, iodine and bromine (4.5 to 6 per cent. in the brown oil, 2.5 to 3 per cent. in the straw-colored oil). This substance is supposed to represent the medicinal properties of cod-liver oil.

Three to five drops are considered the equivalent of 3i of cod-liver oil. It is generally administered in capsule.

## ACTION.

Alterative because of the bromine, iodine and phosphorus that it contains. It is supposed by some to be an efficient substitute for cod-liver oil; it cannot, however, have the same food value.

## USE.

Theoretically, it is useful in the same class of diseases as are benefited by the use of cod-liver oil.

## CETACEUM.

**Spermaceti.**

A peculiar concrete, fatty substance obtained from *Physeter macrocephalus* (the sperm whale), (class, *Mammalia*; order, *Cetacea*).

It occurs in white, somewhat translucent, slightly unctuous masses, becoming yellowish and rancid by exposure to air; odorless, having a mild bland taste, and a neutral reaction. Sp. gr.: about 0.945 at 15° C. Insoluble in water. Soluble in ether, chloroform and boiling alcohol. It melts near 50° C. (122° F.).

Chief constituent. Cetin, a fatty crystallizable substance.

## ACTION.

Emollient, and protective.

## USE.

This is used pharmaceutically, in certain cerates, and ointments.

## ADEPS.

**Lard.**

The prepared internal fat of the abdomen of the *Sus Scrofa* (the

hog); (class, *Mammalia*; order, *Pachydermata*), purified by washing with water, melting, and straining.

Lard should be kept in well-closed vessels impervious to fat, and in a cool place.

It is a soft, white, unctuous solid, having a faint odor free from rancidity, and a bland taste. Insoluble in water; slightly soluble in alcohol; freely soluble in ether, chloroform, etc. Sp. gr.: 0.932, at 15° C. It melts at 38° to 40° C. (100° to 104° F.) to a perfectly clear liquid, which is colorless in thin layers, and which should not separate an aqueous layer.

Chief constituents. Olein, palmitin, and stearin.

#### ACTION.

Emollient, and protective.

#### USE.

Lard is used pharmaceutically, as a basis for ointments, cerates, etc. It easily becomes rancid and is then unfit for use.

**Adeps Benzoinatus.** Benzoinated lard. This contains 2 per cent. of benzoin, and is less liable to become rancid than is the pure lard.

#### USE.

This also is used as a basis for ointments, cerates, etc.

### PEPSINUM.

#### Pepsin.

A proteolytic ferment or enzyme, obtained from the glandular layer of fresh stomachs from healthy pigs (*Sus Scrofa*; class, *Mammalia*; order, *Pachydermata*), and capable of digesting not less than 3000 times its own weight of freshly coagulated, and disintegrated, egg albumen.

It is a fine, white, or yellowish-white, amorphous powder; or thin, pale yellow, transparent scales; free from any offensive odor, and having a mildly acidulous, or slightly saline taste, usually followed by a suggestion of bitterness. It slowly attracts moisture when exposed to the air. Soluble in about 100 parts of water; more soluble in water acidulated with hydrochloric acid; insoluble in alcohol, ether, or chloroform. A solution of pepsin heated to 100° C. (212° F.) loses all proteolytic power. In a dry state it can bear this temperature without injury. Pepsin usually has a slightly acid reaction. It may be neutral, but should never be alkaline.

Dose: 0.30-0.60 Gm. gr. v-x.

#### ACTION.

Pepsin is a digestive ferment, converting proteids into peptones in the presence of an acid (hydrochloric).



## USE.

It may be used in gastric indigestion, due to deficient secretion.

## PEPSINUM SACCHARATUM.

**Saccharated Pepsin.**

This consists of pepsin 10 parts, triturated with sugar of milk 90 parts.

Dose: 1.90-3.75 Gm.  $\frac{3}{4}$ -j.

## ACTION AND USE.

Same as for pepsin. It is but little used.

## PANCREATINUM.

**Pancreatin.**

A mixture of the enzymes naturally existing in the pancreas of warm-blooded animals, usually obtained from the fresh pancreas of the hog (*Sus Scrofa*; class, *Mammalia*; order, *Pachydermata*).

A yellowish or grayish, amorphous powder; odorless, or having a faint, peculiar odor, and a characteristic taste. Slowly and almost completely soluble in water; insoluble in alcohol. Pancreatin digests albuminoids, and converts starch into sugar; prolonged contact with mineral acids renders it inert.

Chief constituents. A starch digesting ferment resembling *ptyalin*; a ferment which digests proteids called *trypsin*; and a milk curdling ferment.

## PREPARATIONS.

Pancreatinum . . . . . 0.30-0.60 Gm. gr. v-x.

Φ Extractum Pancreatis . . . . . 0.30-0.60 Gm. gr. v-x.

Φ Liquor Pancreaticus . . . . . 3.75-7.50 Cc.  $\frac{3}{4}$ -ij.

## ACTION.

That of a digestive ferment, acting in a neutral, alkaline, or slightly acid medium.

## USE.

It may be used in some forms of gastric, and intestinal, indigestion.

## MOSCHUS.

**Musk.**

The dried secretions from the preputial follicles of *Moschus Moschiferus* (*Musk Deer*) (class, *Mammalia*; order, *Ruminantia*).

Habitat. Central Asia.

It occurs in irregular, crumbly, somewhat unctuous grains, dark, reddish brown, having a peculiar, penetrating, and persistent odor, and a bitterish taste. About 10 per cent. of musk is soluble in alcohol. About 50 per cent. of musk is soluble in water.

Chief constituents. Ammonia, an acid, etc.

## PREPARATIONS.

Moschus . . . . . 0.30-0.95 Gm. gr. v-xv.  
 Tinctura Moschi (5 per cent.) . . . . 0.95-3.75 Cc. ℥xv-ʒi.

## ACTION.

Musk is a prompt, diffusible, but transient stimulant, acting upon the nervous system. It is also an anti-spasmodic.

## USE.

It may be used in typhoid fever, or in other forms of fever, when there is threatened collapse. If frequently repeated it soon loses its effect; it should only be given, therefore, to carry the patient past a crisis. It is not in common use, for other stimulants, such as alcohol, ether, camphor, strychnine, etc., are generally more easily obtained.

## Φ SANGUIS.

**Blood.**

The arterial blood of *Bos Taurus* (Ox) (class, *Mammalia*; order, *Ruminantia*).

This is a bright red, opaque fluid. Sp. gr.: 1.050.

Chief constituents, albumin, fibrin, salts, blood-corpuscles, and water. The color is due to hæmoglobin.

Dose (desiccated): 0.30-0.95 Gm. gr. v-xv.

## ACTION.

Nutritive, or restorative.

## USE.

It may be used in certain wasting diseases.

## Φ HÆMOGLOBIN.

This is the red coloring principle of the blood.

Dose (desiccated): 0.12-0.30 Gm. gr. ij-v.

## ACTION.

The action is due to the iron it contains in a presumably easily assimilated form. It is absorbed, thus having an advantage over many of the iron preparations.

## USE.

It may be used in anæmia, chlorosis, etc. It is best given in capsules, or in tablets.

## Φ HÆMOGALLOL.

This is a reddish-brown powder obtained by the action of pyrogallol, on the coloring matter of the blood. It is hæmoglobin deoxidized.

Dose: 0.12-0.30 Gm. gr. ij-v.

## ACTION.

This is due to the presence of iron in an easily assimilated form. After entering the circulation, it is supposed to take up oxygen, and become active hæmoglobin again. It is supposed to have many advantages over the preparations of metallic iron.

## USE.

It may be used in anæmia, chlorosis, etc. It is best given in capsules, or in tablets.

## Φ HEMOL.

This is a reddish-brown powder obtained by the action of zinc dust on the coloring matter of the blood.

Dose: 0.12–0.30 Gm. gr. ij–v.

## ACTION AND USE.

The same as that of hæmogallol.

## FEL BOVIS.

**Ox Gall.**

The fresh bile of *Bos Taurus* (the ox), (class, *Mammalia*; order, *Ruminantia*).

It is a brownish-green, or dark green, somewhat viscid liquid, having a peculiar, unpleasant odor, and a disagreeable, bitter taste. Sp. gr.: 1.018 to 1.028, at 15° C. Reaction neutral, or slightly alkaline.

Chief constituents. Glycocholic, and taurocholic, acids.

**Fel Bovis Purificatum.** Purified ox gall. Obtained by precipitation with alcohol.

Dose: 0.30–0.60 Gm. gr. v–x.

## ACTION.

It precipitates pepsin, and interferes with the digestion of albuminous substances in the stomach. It quickens the absorption of fats. It is antiseptic, and prevents to some extent putrefactive changes in the intestinal canal. It increases peristalsis, and has a laxative action (nature's cathartic).

## USE.

It may be used when there is deficient secretion of bile; or impaired elimination of bile; or deficient digestion of fats, due to absence, or diminished quantity, of bile. It interferes with gastric digestion, and should, therefore, be administered some hours after meals, in order that gastric digestion may have been completed. It is well to prescribe it in pill form, with a coating of shellac, or keratine.

**SACCHARUM LACTIS.**  $C_{12}H_{22}O_{11} + H_2O$ .**Sugar of Milk.** Lactose.

A peculiar, crystalline sugar, obtained from the whey of cows' milk, by evaporation, and purified by recrystallization.

It occurs in white, hard, crystalline masses, yielding a white powder, feeling gritty on the tongue; odorless, having a faintly sweet taste. The aqueous solution has a neutral reaction. Soluble, at  $15^{\circ}$  C., in 6 parts of water, and in 1 part of boiling water; insoluble in alcohol, ether, and chloroform.

**ACTION.**

Laxative, demulcent, and diuretic.

**USE.**

It is preferred as a sweetening agent in preparing cows' milk for infant feeding, because it is less likely to ferment than is cane sugar, or beet sugar.

Pharmaceutically, it is used in triturates; also to increase the bulk of small powders.

**SEVUM.****Suet. Mutton Suet.**

The internal fat of the abdomen of the *Ovis Aries* (domestic sheep) (class, *Mammalia*; order, *Ruminantia*) purified by melting, and straining.

Suet should be kept in well-closed vessels, impervious to fat. It should not be used after it has become rancid.

It is a white, solid fat; nearly odorless, and having a bland taste when fresh, but becoming rancid on long exposure to air. Insoluble in water, or cold alcohol. It melts between  $45^{\circ}$  and  $50^{\circ}$  C. ( $113^{\circ}$  and  $122^{\circ}$  F.).

Chief constituents. Stearin, and palmitin.

**ACTION.**

Emollient, protective.

**USE.**

Pharmaceutically, it is used in various ointments, cerates, and plasters.

**ADEPS LANÆ HYDROSUS.****Hydrous Wool-fat. Lanolin.**

The purified fat of the wool of the *Ovis Aries* (domestic sheep) (class, *Mammalia*; order, *Ruminantia*), mixed with not less than 30 per cent. of water.

It is a yellowish-white, or nearly white, ointment-like mass, having a faint, peculiar odor. Insoluble in water, but miscible with twice its

weight of water, without losing its ointment-like character. With ether, or chloroform, it yields turbid solutions, which have a neutral reaction. It melts at 40° C. (104° F.).

Chief constituents. Cholesterin, combined with fatty acids.

#### ACTION.

Emollient, protective.

#### USE.

This is an excellent basis for ointments, especially when absorption of the medicament is wanted.

### Φ GELATINA.

#### Gelatin.

Bone, cartilage, skins, tendons, and ligaments, are boiled in water until dissolved, and the resulting jelly is dried in the air.

It occurs in thin, transparent sheets, or porous and opaque, sheets or layers. The solution in hot water is colorless and odorless. Inferior kinds of gelatin are called glue.

Chief constituent. Glutin.

#### ACTION.

Emollient, protective, slightly nutritive.

#### USE.

It may be used as an article of diet during convalescence from acute disease, but its food value is very slight. It may be used to allay the irritation produced throughout the alimentary canal by corrosive poisons. It may be used in baths, or in the form of plasters, in the treatment of skin diseases.

Pharmaceutically, it is used in preparing plasters, coating pills, and making capsules.



## PART VII.

### THE VEGETABLE KINGDOM.

#### CIMICIFUGA.

**Black Snake-root.** Black-cohosh.

The rhizome and rootlets of the *Cimicifuga racemosa* (Nat. Ord. *Ranunculaceæ*); of a slight but heavy odor, and a bitter, acrid taste.

Habitat. North America.

Chief constituents. A volatile oil, a resin, and a bitter, neutral substance. It is not yet determined to which of these its activity is due.

#### PREPARATIONS.

Cimicifuga (powdered) . . . . . 0.60–1.25 Gm. gr. x–xx.

Extractum Cimicifugæ . . . . . 0.06–0.30 Gm. gr. i–v.

Extractum Cimicifugæ Fluidum . . . 0.60–1.25 Cc. ℥ x–xx.

Tinctura Cimicifugæ (20 per cent.) . . 1.90–3.75 Cc. ʒ½–j.

#### ACTION.

Through stimulation of the vagus it slows the heart. It increases the heart's force by direct influence upon the heart muscle, and by increased resistance due to stimulation of the vaso-constrictors. Toxic doses have the reverse, or paralyzing action on the vagus, and on the vaso-constrictors. So far the drug resembles digitalis. \*

It increases the contractile power of involuntary muscular fibre throughout the body, thus resembling the action of ergot.

It paralyzes the sensory tract of the spinal cord, thus having a sedative action, like aconite.

While it resembles these three drugs in action it is much feebler than any of them.

#### USE.

Cimicifuga may be used as a mild cardiac tonic in heart disease. It may be used to produce normal uterine contractions during labor, or to allay the "after-pains." It may be used in some forms of neuralgia. Also in muscular rheumatism.

#### HYDRASTIS.

**Golden-seal.** Yellow-root. Indian-dye.

The rhizome and rootlets of the *Hydrastis Canadensis* (Nat. ord., *Ranunculaceæ*); odor slight; taste bitter.

Habitat. North America.

Chief constituents. Hydrastine, and berberine.

#### PREPARATIONS.

Extractum Hydrastis Fluidum . . . . 0.30-1.25 Cc. ℥ v-xx.

Glyceritum Hydrastis . . . . . 1.90-3.75 Cc. ʒ½-j.

Tinctura Hydrastis (20 per cent.) . . . 1.90-3.75 Cc. ʒ½-j.

#### ACTION.

Tonic, hæmostatic, antiperiodic, antiseptic.

It increases secretion of the gastro-intestinal mucous membrane; increases peristalsis; increases the secretion of bile. In all of these points has the general action of a so-called bitter tonic. Applied locally it causes contraction of the blood-vessels, probably through stimulation of the vaso-constrictors. It has a distinctive action on the lower organisms, thus resembling cinchona, and its alkaloids.

#### USE.

It may be used in the treatment of chronic catarrhal conditions; also as a simple bitter in some forms of indigestion.



#### Berberine.

This is one of the most widely diffused of the alkaloids. It occurs as a bright-yellow powder, with a very bitter taste. It is soluble in 100 parts of cold water: less soluble in alcohol; freely soluble in both hot water, or hot alcohol; insoluble in ether. Its hydrochlorate, and sulphate, are but sparingly soluble, but the acetate is freely soluble.

Dose, 0.12-0.30 Gm. gr. ij-v.

#### ACTION AND USE.

That of hydrastis, as a bitter tonic, or antiperiodic. Large toxic doses cause spinal, tetanic convulsions, followed by paralysis.



#### Hydrastine.

This is an alkaloid occurring in the form of white crystals; odorless, and almost tasteless. Soluble in alcohol, ether and chloroform, but insoluble in water. Its salts, the nitrate, sulphate, tartrate, and especially the hydrochlorate, are soluble in water.

Dose: 0.01-0.03 Gm. gr. ⅙-½.

#### ACTION.

That of hydrastis. It is more toxic than berberine.

**HYDRASTININÆ HYDROCHLORAS.**  $C_{11}H_{11}NO_2HCl$ .**Hydrastinine Hydrochlorate.**

This is an artificial alkaloid derived from hydrastine. It occurs as light yellow, amorphous granules, or as a pale yellow, crystalline powder; odorless, having a bitter, saline taste; deliquescent on exposure to damp air. Soluble, at  $15^{\circ} C.$ , in 0.3 part of water, and in 3 parts of alcohol. Reaction, acid.

Dose: 0.01–0.03 Gm. gr.  $\frac{1}{6}$ – $\frac{1}{2}$ .

**ACTION AND USE.**

That of hydrastis.

**PULSATILLA.**

**Anemone.** Pasque-flower. Wind-flower.

The herb of the *Anemone Pulsatilla* and *A. pratensis*. (Nat. ord., *Ranunculaceæ*). Collected soon after flowering, and should not be kept more than one year. Odorless, very acid.

Habitat. Southern Europe, and Western North America.

Chief constituents. Anemonin,  $C_{15}H_{12}O_6$ , convertible into anemoniic acid,  $C_{15}H_{14}O_7$ , by the action of alkalies. Anemone-camphor is an unstable product which splits up into anemonin and anemoniic acid.

**PREPARATION.**

∅ Tinctura Pulsatillæ (50 per cent.) . . . 0.06–0.30 Cc. ℥i–v.

**ACTION.**

Pulsatilla acts as a local irritant, even to the degree of vesication. The fresh juice will cause tingling and burning, followed by numbness in the part to which it is applied. If swallowed it may cause severe irritation of the gastro-intestinal mucous membrane. Through the vagus nerve it has a sedative action upon the heart; the vaso-motor system is also depressed. The heart's action is, therefore, slower; arterial tension is diminished; blood-pressure falls. It may cause diaphoresis, and diuresis. It is supposed, by some, to have a specific action (sedative) upon the generative organs.

**USE.**

It is very questionable whether this drug has advantages over, or is in any way equal to, aconite—the drug which it closely resembles in action. In fresh preparations it may be used in the treatment of dysmenorrhœa, epididymitis, etc. In a general way it may be stated that aconite displaces it therapeutically.

$\Phi$  ANEMONIN.  $C_{15}H_{12}O_6$ .**Anemonin.**

This occurs as colorless crystalline needles; readily soluble in warm water, but insoluble in cold water, or in ether.

Dose: 0.01–0.03 Gm. gr.  $\frac{1}{6}$ – $\frac{1}{2}$ .

## ACTION AND USE.

• The same as that described for *pulsatilla*; in fact it is for the action of anemonin that *pulsatilla* is used.

 $\Phi$  ADONIDIN.

This is a glucoside derived from *adonis vernalis* (nat. ord. *Ranunculaceæ*).

Dose: 0.01–0.03 Gm. gr.  $\frac{1}{6}$ – $\frac{1}{2}$ .

## ACTION.

This, the active principle of *adonis vernalis*, has the general properties of digitalis. It increases the heart's force, and increases blood-pressure. It is not cumulative.

## USE.

It may be used as a cardiac tonic, instead of digitalis.

**STAPHISAGRIA.****Stavesacre.** Larkspur.

The seeds of the *Delphinium Staphisagria* (Nat. ord., *Ranunculaceæ*). Nearly odorless; taste bitter, and acrid.

Chief constituents. Delphinine, and staphisagrine.

Preparations: There are none official.

## ACTION.

This acts as a local irritant, causing tingling, burning, and even inflammation. Its action upon the heart, and respiration, resembles that of aconite.

## USE.

There is no practical use for this drug. It is sometimes used as a parasiticide.

**ACONITUM.****Aconite.** Monks-hood. Wolfs-bane.

The tuberous root of the *Aconitum Napellus* (Nat. ord., *Ranunculaceæ*) collected in winter, or early spring, before the leaves have appeared. Odorless; taste at first sweetish, soon becoming acrid.

Habitat. Mountainous districts of Europe, Asia, and northwestern North America.

Chief constituent. Aconitine.

## PREPARATIONS.

Extractum Aconiti . . . . .	0.01-0.02 Gm. gr. $\frac{1}{6}$ - $\frac{1}{3}$ .
Extractum Aconiti Fluidum . . . .	0.02-0.03 Cc. ℥ $\frac{1}{3}$ - $\frac{1}{2}$ .
Tinctura Aconiti (35%) . . . . .	0.03-0.18 Cc. ℥ $\frac{1}{2}$ -iij.

## ACTION.

Sedative, anodyne, antipyretic, toxic.

Locally, it causes a sensation of tingling, due to irritation; followed by numbness of the skin or mucous membrane, due to its paralyzing action on the peripheral sensory nerves: It is thus a local anodyne. A similar sensation results from its internal administration, affecting the parts in the order of their sensitiveness, viz., the tongue and lips, finger tips, face, etc.

Its chief action is that of a depressant upon the sensory tract of the cord, and upon the sensory nerves in general, the peripheral sensory nerves being the first affected.

Through the vagus roots it has a sedative action on the heart; the heart's action is slower. The vaso-motor system is depressed; arterial tension is diminished. Blood-pressure falls, in part because of diminished heart's action, in part because of dilated blood-vessels.

There is increased diaphoresis, probably due to the dilated condition of the small blood-vessels.

Its antipyretic action is due to increased heat dissipation, and impaired circulation.

In moderate doses aconite quiets respiration; in toxic doses it causes death by paralysis of the respiratory centre.

## USE.

Locally, aconite is used for its anodyne action to relieve pain in neuralgia, rheumatism, etc. A tincture, or a liniment, is the most convenient preparation for such use.

Internally, aconite is used in the early stage of acute inflammatory conditions, for its sedative action upon the nervous system, and upon the circulatory system. At the same time the antipyretic action of the drug is secured. When aconite is to be prescribed it is well to decide what the *daily* dose shall be and to so divide this dose that a small quantity of the drug may be given every 15 or 30 minutes.

**Aconitine.**

This is an alkaloid which exists either in an amorphous, or in a crystalline form; odorless, with an intensely bitter taste, and an alkaline reaction. Sparingly soluble in water; soluble in alcohol.

Dose: 0.0002-0.0006 Gm. gr.  $\frac{1}{800}$ - $\frac{1}{100}$ .



## ACTION.

The action described under aconite is the action of this alkaloid, for this is the *active principle* of aconite.

## USE.

The same as that of aconite. Care must be taken in prescribing this drug to use a reliable preparation.

## TOXICOLOGY.

The early symptoms of poisoning from aconitine, or aconite, are prickling sensations in the throat, mouth, and extremities. Then follow, general relaxation; anæsthesia of the surface; a weak intermittent pulse; feeble, shallow respiration; profuse perspiration; countenance pale, and anxious; protrusion of eyes, dilated pupil, loss of sight, and sometimes diplopia; temperature lowered; death by paralysis of respiration. Consciousness may be present to the end. There may be severe gastric pain.

*Treatment.*—The prone posture; the application of artificial heat; the use of artificial respiration; clearing the stomach, by means of the stomach-tube, but avoiding the use of emetics; the use of strychnine hypodermatically as a cardiac, and respiratory, stimulant.

## ILLICIUM.

## Star Anise.

The dried fruit of *Illicium verum* (Nat. ord., *Magnoliaceæ*). This has an anise-like odor; taste, sweet, and aromatic.

Chief constituent. A volatile oil, resembling true oil of anise,

## ACTION.

Stimulant, carminative, anodyne, diuretic.

## USE.

This may be used for its carminative properties in flatulence, etc. It is used pharmaceutically, as a flavoring agent.

## CALUMBA.

## Columbo, Colombo.

The root, cut transversely, of *Jateorhiza palmata* (Nat. ord., *Meispermaceæ*). Odor, slight; taste, mucilaginous, slightly aromatic, very bitter.

Habitat. Eastern Africa.

Chief constituents. Columbin, berberine, calumbic acid. No tannin.

Columbin,  $C_{21}H_{22}O_7$ , is a white, crystalline substance; odorless, but extremely bitter. Sparingly soluble in water, alcohol, or ether, at ordinary temperatures. It is neutral in reaction.

Columbic acid,  $C_{22}H_{24}O_7$ , occurs as a yellow, amorphous substance, somewhat less bitter than Columbin. Sparingly soluble in water; soluble in alcohol, and alkaline solutions.

Berberine—see Hydrastis.

#### PREPARATIONS.

Calumba (powdered) . . . . . 0.60–1.25 Gm. gr. x–xx.

Extractum Calumbæ Fluidum . . . . . 0.60–1.25 Cc. ℥x–xx.

Tinctura Calumbæ (10 per cent.) . . . 1.90–3.75 Cc. ʒ½–j.

#### ACTION.

Tonic. Calumba is one of the most useful of the simple bitters. It is not astringent, and has very mild stimulating properties. By reflex action it increases the secretion of saliva, and of the gastric juice, thus increasing the appetite, promoting digestion, and favoring constructive metamorphosis.

#### USE.

This is used, after the manner of the so-called simple bitters, to improve digestion in atonic dyspepsia, during convalescence from acute disease, etc. It may be prescribed with iron preparations.

#### MENISPERMUM.

**Canadian Moon-seed.** Vine apple.

The rhizome and roots of the *Menispermum canadense* (Nat. ord., *Menispermaceæ*). This is nearly odorless; taste bitter.

Chief constituents. Berberine, and tannic acid.

#### PREPARATION.

Extractum Menispermæ Fluidum . . . . . 0.60–1.25 Cc. ℥x–xx.

#### ACTION.

That of a bitter tonic.

#### USE.

Like that of Calumba, *q. v.*

#### PAIREIRA.

The dried root of the *Chondodendron tomentosum* (Nat. ord., *Menispermaceæ*). This is odorless; taste bitter.

Chief constituent. Buxine.

#### PREPARATION.

Extractum Pareiræ Fluidum . . . . . 1.90–7.50 Cc. ʒ½–ij.

#### ACTION.

Paireira has the action of a simple, non-irritating, diuretic.

## USE.

It may be used in chronic inflammatory diseases of the genito-urinary tract.

**PICROTOXINUM.**  $C_{30}H_{24}O_{13}$ .**Picrotoxin.**

A neutral principle obtained from the seeds of *Anamirta Paniculata* (Cocculus Indicus). (Nat. ord., *Menispermaceæ*.)

It occurs as colorless, flexible, shining, prismatic crystals, or a micro-crystalline powder; odorless, and having a bitter taste; permanent in the air; sparingly soluble in water; soluble in alcohol.

Dose, 0.0006–0.0012 Gm. gr.  $\frac{1}{100}$ – $\frac{1}{80}$ .

## ACTION.

This is a parasiticide. It is also a cerebro-spinal irritant, causing convulsions when given in toxic doses. It increases all of the secretions, especially that of the sweat glands. Small doses act as a respiratory stimulant.

## USE.

Externally (a 2 per cent. ointment) it may be used to destroy pediculi. Sufficient absorption may take place to give rise to toxic symptoms, therefore it is a dangerous drug.

Internally, it may be used as a substitute for strychnine. It may also be used to check the night-sweating of phthisis.

**CAULOPHYLLUM.****Blue-cohosh.** Squaw-root.

The rhizome and roots of the *Caulophyllum thalictroides* (Nat. ord., *Berberidaceæ*). Nearly odorless; taste bitter, and somewhat acrid.

Chief constituent. Saponin (see Quillaja).

Dose, 0.30–1.25 Gm. gr. v–xx.

## ACTION.

Antispasmodic, emmenagogue, diuretic.

## USE.

This drug, though official, is but little used. When used it is for its action on the uterus.

**PODOPHYLLUM.****May-apple.** Mandrake.

The dried rhizome and rootlets of *Podophyllum peltatum* (Nat. ord., *Berberidaceæ*). Nearly odorless; taste bitter, and acrid.

Habitat. North America.

Chief constituent. Picropodophyllin (a neutral principle).

## PREPARATIONS.

Podophyllum (powdered) . . . . .	0.12-0.60 Gm. gr. ij-x.
Extractum Podophylli . . . . .	0.03-0.18 Gm. gr. ½-ijj.
Extractum Podophylli Fluidum . . . . .	0.12-0.60 Cc. ℥ ij-x.
Resina Podophylli (Podophyllin) . . . . .	0.01-0.03 Gm. gr. ⅓-½.

## ACTION.

Cholagogue, cathartic, irritant.

It increases the secretion of bile, and of the intestinal mucous membrane. Its action is apparent, whether given hypodermatically, or by the mouth. It is one of the slowest-acting purgatives in the pharmacopœia.

## USE.

Podophyllum is used for its laxative, or cholagogue action, in the treatment of chronic constipation, "biliousness," malaria, etc.

## OPIUM.

The concrete milky juice, obtained by incising the unripe capsule of the *Papaver somniferum* (Nat. ord., *Papaveraceæ*).

Habitat. Western Asia.

Chief constituents. Morphine, 2.5 to 15 per cent.; codeine, 0.2 to 0.7 per cent.; narcotine, 1 to 10 per cent.; narceine, 0.02 to 0.7 per cent.; thebaine, 0.15 to 1 per cent.; meconic acid, etc.

Opium occurs as a brownish mass, having a peculiar odor, and a bitter taste.

*General Action.*—When opium, or any of its preparations, are used, the action may be variable, because of the varying proportions of its active principles. The action that is wanted is that of morphine, and codeine. Narcotine is neither hypnotic nor anodyne in action; it is antipyretic, and anti-periodic. The action of narceine is not determined. Thebaine resembles strychnine in action. Meconic acid has little or no action. There are more than twenty active principles present in opium in varying proportions and with uncertain physiological action.

For further action, use, and toxicology of opium, see morphine, p. 230.

## PREPARATIONS.

Opium . . . . .	0.06-0.12 Gm. gr. j-ij.
Opii Pulvis . . . . .	0.03-0.06 Gm. gr. ½-j.
Pilula Opii.	
Opium Deodoratum . . . . .	0.03-0.06 Gm. gr. ½-j.
Extractum Opii . . . . .	0.03-0.06 Gm. gr. ½-j.
Emplastrum Opii . . . . .	For external use.
Trochisci Glycyrrhizæ et Opii.	

Pulvis Ipecacuanhæ et Opii. . . . 0.30–0.60 Gm. gr. v–x.

Tinctura Ipecacuanhæ et Opii,	}	. . . 0.30–0.60 Cc. ℥ v–x.
Acetum Opii		
Vinum Opii		
Tinctura Opii,		
Tinctura Opii Deodorati,		
Tinctura Opii Camphorata . . . . .		1.90–7.50 Cc. ʒ½–ij.

Gum opium should yield 9 per cent. morphine.

Powdered opium should yield 13 to 15 per cent. morphine.

Opium pill contains 0.06 Gm. (gr. i) of powdered opium in each pill.

Troches of liquorice and opium contain .006 Gm. (gr.  $\frac{1}{16}$ ) of powdered opium in each.

Deodorized opium is prepared from powdered opium and should contain from 13 to 15 per cent. of morphine. The opium, by the action of ether, is deprived of its narcotine, and, of the odoriferous principles, and is, therefore, less apt to cause unpleasant after-effects than is the crude opium. It contains a small amount of sugar of milk.

Extract of opium contains about 18 per cent. morphine.

Opium plaster contains 6 per cent. of the extract.

Pulvis Ipecacuanhæ et Opii (Dover's powder) contains 10 per cent. each of powdered opium, and of powdered ipecac.

Tinctura Ipecacuanhæ et Opii (liquid Dover's powder) contains 10 per cent. of opium (in the form of the deodorized tincture), and 10 per cent. of fluid extract of ipecac.

Acetum Opii (black drop).	}	All contain 10 per cent. of powdered opium.
Tinctura Opii (laudanum).		
Tinctura Opii deodorati.		
Vinum Opii (Sydenham's laudanum).		

Tinctura Opii Camphorata (paregoric) contains 4 parts in 1000 of powdered opium, camphor, benzoic acid, and oil of anise, and 40 parts of glycerin.

**MORPHINA.**  $C_{17}H_{19}NO_3 + H_2O$ .

### Morphine.

This alkaloid, obtained from opium, occurs in colorless, or white, shining crystals, or as fine needles, or as a crystalline powder; odorless, having a bitter taste, and an alkaline reaction. Permanent in the air. Sparingly soluble, at 15° C., in water, or in alcohol.

### PREPARATIONS.

Morphinæ Acetas, . . .	}	. . . 0.01–0.03 Gm. gr. $\frac{1}{16}$ – $\frac{1}{2}$ .
Morphinæ Hydrochloras, .		
Morphinæ Sulphas, . . .		

Pulvis Morphinæ Compositus, . . . 0.30–0.60 Gm. gr. v–x.

Troschisci Morphinæ et Ipecacuanhæ.



The salts of morphine (acetate, hydrochlorate, and sulphate) all occur as a white, or yellowish-white, powder, or crystals; odorless; taste bitter. All are soluble in water, and in alcohol.

*Pulvis Morphinae Compositus* (Tully's powder) contains in 60 parts, 1 part of morphine sulphate, 19 parts of camphor, 20 parts of licorice, and 20 parts of precipitated calcium carbonate.

Troches of Morphine and Ipecacuanha contain about .015 Gm. ( $\frac{1}{8}$  gr.) of morphine sulphate, and about .005 Gm. ( $\frac{1}{2}$  gr.) of powdered ipecac.

### ACTION.

Morphine, or its salts, represents the action of opium. It is anodyne, hypnotic, sedative, anti-spasmodic, toxic.

Locally, morphine probably has no action when applied to the unbroken skin. Absorption may take place through wounds, denuded, or granulating surfaces, or through mucous surfaces, and produce local sedative, and anodyne action.

Internally, the principal action is on the nervous system, affecting first, the cerebral convolutions which are stimulated for a brief period, then depressed, producing sleep. With doses too small to produce sleep there may be complete relief from pain, and from all unpleasant nervous disturbances; the individual is extremely comfortable. As the effects of the drug wear off, previous nervous symptoms return, and are even intensified; the individual is extremely uncomfortable. Herein lies one of the dangers which may lead to the formation of the opium habit. With large doses the stage of stimulation may be short or absent. Some individuals do not bear morphine well, and with such the stage of stimulation may be marked, while the stage of depression is slight, or absent.

The perceptive, or sensory centres, are, first excited, then paralyzed; the power of conduction of the afferent nerves is impaired; sensation is diminished, and pain, when present, is relieved. The pupil is markedly contracted, and this is probably due to central causes.

The first effect upon the circulation is to cause dilatation of the superficial vessels, sometimes causing an eruption, and accompanied by itching; or the itching may be present without any eruption. Small doses have no effect upon the pulse, but larger doses slow the pulse, increase its force, and raise arterial tension. The slowing of the pulse depends on stimulation of the pneumogastric nerve; the increase in force of the pulse is due to stimulation of the heart muscle; the rise in blood-pressure is due to increased heart's action, and vaso-motor stimulation. In small doses morphine is a respiratory stimulant; in large doses it is an active paralyzer of the respiratory centre in the medulla. Death results from paralysis of respiration.

By its general action it diminishes tissue waste. In diabetes mellitus

it diminishes the elimination of sugar. Secretions are all diminished except that of skin, and kidneys. Peristalsis is diminished by the arrest of intestinal secretion, and the abolition of intestinal reflexes. Constipation results from diminished secretion, and diminished peristalsis.

Children, and old people, do not bear morphine well.

Reaction from the use of morphine may not be unpleasant; or it may be accompanied by nausea, headache, impaired digestion, constipation, hoarseness, etc.

Elimination takes place through the gastric mucous membranes, the liver, and the kidneys. Most of the drug is destroyed in the body, but some is eliminated unchanged.

### USE.

Opium and the salts of morphine are our most reliable agents for use in relieving pain. Action is most promptly and satisfactorily secured by the hypodermatic injection of the morphine preparations. In the treatment of abdominal and pelvic pains, the administration of opium or morphine by the rectum often gives better results than when administered by the mouth.

Always in administering opium or morphine, the general systemic disturbance, as well as the danger of forming the drug habit, must be kept in mind, and, when possible, milder and safer anodynes should be used.

Belladonna or atropine salts increase the anodyne action and diminish the systemic disturbance of opium or morphine. It is often well, therefore, to combine these drugs.

As sleep-producers, opium and morphine again take first place. They will succeed when all other drugs fail. The sleep produced is not so restful or so natural, as that which follows the use of many other hypnotics; and the systemic disturbance is often sufficient to counteract, in part, the benefit secured through sleep. It is well, therefore, before prescribing these drugs as hypnotics, to weigh carefully their untoward effects, and, if less objectionable preparations are likely to produce the desired effect, they should be given the preference.

Opium or morphine is our most reliable agent for securing the combined action of an anodyne and a hypnotic in those cases where sleeplessness is due to pain.

While opium or morphine are excellent sedatives, their use in nervous irritability should be governed by extreme care, for here again there is a great tendency to the formation of a "habit."

When there is an inflammatory condition of the brain, the spinal cord, or the meninges, opium or morphine is contraindicated.

In some of the acute febrile diseases, these preparations may be of benefit as sedatives, and also as conservers of tissue.

As diaphoretics, they are generally used in combination with other drugs, thus: opium and ipecac, in Dover's powder.

Morphine and camphor, in Tully's powder, may be given in the early stage of a "cold," to relieve the congestion of the respiratory organs.

In diseases of the alimentary canal, when a profuse secretion continues after the source of irritation has been removed, opium or morphine alone, or, better still, with tonics or local astringents, may be used to check such secretions.

Opium or morphine is used in diabetes mellitus, to diminish the elimination of sugar.

#### TOXICOLOGY.

An over-dose of opium or morphine will cause profound sleep, attended by the characteristic, slow stertorous, breathing, and the contracted "pin-hole" pupil. Death follows from paralysis of the respiratory center.

*Treatment.*—Strychnine, caffeine, strong coffee, atropine, etc., are given for their physiological action as cardiac and respiratory stimulants. Potassium permanganate is used as a chemical antidote. (See potassii permanganas.) Artificial respiration must be insisted upon in failure of respiration.

Emetics cannot be depended upon to empty the stomach. The syphon tube is a safe and speedy means of bringing this about. This emptying of the stomach is very essential, not only to remove any portion of the drug still unabsorbed, but also, to cause the removal of any portion of the drug that may be eliminated by the gastric mucous membrane.



#### Codeine.

This is an alkaloid obtained from opium. It occurs as white, or nearly translucent prisms, or as crystals; odorless, having a faintly bitter taste and a neutral reaction; slightly effervescent in warm air. Soluble, at 15° C., in 80 parts of water and in 3 parts of alcohol.

#### PREPARATIONS.

Codeina . . . . .	0.01-0.06 Gm. gr. ⅙-j.
∅ Codeinæ Sulphas . . . . .	0.01-0.06 Gm. gr. ⅙-j.

#### ACTION.

This has but slight anodyne action. It resembles morphine in a general way, with the possible advantage of producing fewer unpleasant symptoms during the stage of reaction following its use. There is less danger of the formation of a "habit" with the use of codeine than with opium or morphine preparations. It is an excellent sedative.

## USE.

It is a convenient sedative for use in cough mixtures. It is well borne by children and may, when necessary, be used as a hypnotic, or as a mild anodyne. In diabetes mellitus, its use diminishes the quantity of sugar eliminated.

**APOMORPHINÆ HYDROCHLORAS.**  $C_{17}H_{17}NO_2HCl$ .**Apomorphine Hydrochlorate.**

This is the hydrochlorate of an artificial alkaloid obtained from morphine or codeine. It should be kept in small, dark, amber-colored vials.

It occurs in minute, grayish-white, shining crystals; odorless, with a faintly bitter taste, and acquiring a greenish tint upon exposure to light or air. It has a neutral reaction. Soluble, at  $15^{\circ}C$ ., in 45 parts of water, or in 45 parts of alcohol.

Dose, 0.005–0.01 Gm. gr.  $\frac{1}{12}$ – $\frac{1}{8}$ .

## ACTION.

Apomorphine is an emetic through a direct action upon the vomiting centre. It is prompt, certain, and unirritating, and causes but little nausea. Small doses increase the secretion of the bronchial mucous membrane and thus act as an expectorant. Large doses are depressant to the heart and respiration.

## USE.

A small dose (0.001–0.002 Gm. gr.  $\frac{1}{60}$ – $\frac{1}{30}$ ) may be used as an expectorant, generally in combination with other drugs. The prescribed dose is used hypodermatically where prompt, non-depressing emesis is wanted, as in cases of poisoning.

**SANGUINARIA.****Blood-root.**

The rhizome of *Sanguinaria canadensis* (Nat. ord. *Papaveraceæ*), collected in autumn. Odor slight; taste persistently bitter, and acrid.

Chief constituent. Sanguinarin,  $C_{19}H_{17}NO_4$ .

## PREPARATIONS.

Extractum Sanguinariæ Fluidum . . 0.06–0.30 Cc. Mj–v.

Tinctura Sanguinariæ (15 per cent.) . 0.30–0.95 Cc. Mv–xv.

♂ Sanguinarinæ Nitras . . . . . 0.005–0.01 Gm. gr.  $\frac{1}{12}$ – $\frac{1}{6}$ .

## ACTION.

Expectorant in small doses; emetic in large doses.

## USE.

The therapeutic use of this drug is very limited at the present time. When stimulating expectorants are required it may be given alone or in combination with other expectorants.

## CHELIDONIUM.

**Celandine.** Tetter-wort.

The plant *Chelidonium majus* (Nat. ord., *Papaveraceæ*). It has an unpleasant odor, and an acrid taste.

Chief constituent. Chelerythrine (supposed to be identical with sanguinarin).

Dose: 0.30–0.95 Gm. gr. v–xv.

## ACTION.

Like sanguinaria, it is an expectorant in small doses; an emetic in large doses.

## USE.

Chelidonium still has a place in the pharmacopœia, but its therapeutic use may conveniently be relegated to the past.

## SINAPIS ALBA.

**White Mustard.**

The seeds of the *Brassica alba* (Nat. ord. *Cruciferæ*). These seeds are odorless, and have a pungent, acrid taste.

Habitat. Europe. Cultivated in the United States.

Chief constituents. Sinalbin,  $C_{30}H_{44}N_2S_2O_{16}$ , a crystallizable substance. Myrosin an albuminous ferment, and a fixed oil. Sinalbin, by the action of the ferment, myrosin, and water, is converted into a volatile oil, sulpho-cyanate of acrinyl. The ferment, myrosin, in the presence of moisture, is destroyed by a temperature of 60° C. (140° F.), hence, mustard powder mixed with boiling water yields no volatile oil.

## ACTION AND USE.

This is the same as for *sinapis nigra*, *q. v.*

## SINAPIS NIGRA.

**Black Mustard.**

The seeds of the *Brassica nigra* (Nat. ord., *Cruciferæ*). These seeds are odorless and have a pungent, acrid taste.

Habitat. Europe. Cultivated in the United States.

Chief constituents. Sinigrin (potassium myronate),  $C_{10}H_{18}KNS_2O_{10}$ , myrosin an albuminous ferment, and a fixed oil. Sinigrin, by the action of the ferment, and water, is converted into a volatile oil, sulpho-cyanate of



acrinyl. To this volatile oil (*Oleum Sinapis Volatile*) is due the pungent taste and odor of the moistened powder.

#### PREPARATIONS.

Sinapis (emetic dose) . . . . . 3.75-7.50 Gm. ʒj-ij.

Charta Sinapis. About 0.36 Gm. (gr. vj) powdered sinapis to the sq. in.

#### ACTION.

The unbroken seeds may act as a mechanical laxative.

The powdered mustard moistened (through the development of the volatile oil), has a deodorant, antiseptic, stimulant, and irritant action.

Taken internally a small dose acts as a gastric stimulant, and tonic; a large dose acts as a prompt emetic.

#### USE.

Mustard flour is used as though it were a powdered soap in deodorizing and disinfecting the hands, preparatory to a surgical operation. It is applied externally, in the form of a plaster, as a rubefacient and counter-irritant. Internally, it is used where prompt emesis, without depression, is wanted, as in poisoning from narcotics.

#### OLEUM SINAPIS VOLATILE.

##### Volatile Oil of Mustard.

A volatile oil obtained from black mustard by maceration with water and subsequent distillation. It should be kept in well-stoppered bottles, in a cool place, protected from light.

It is a colorless or pale-yellow, turbid, and sharply refractive liquid, having a very pungent, and acrid, odor and taste. Sp. gr. : 1.018 to 1.029, at 15° C.

#### PREPARATION.

Linimentum Sinapis Compositum (3 per cent.) . . For external use.

#### ACTION.

The properties of the volatile oil have already been described under *sinapis nigra*, q. v.

#### USE.

The volatile oil is seldom used alone. It is only as it is present in the moistened flour that it is used as a deodorant, antiseptic, irritant, counter-irritant, or emetic.

#### SENEGA.

##### Snake root. Milk root.

The root of *Polygala Senega* (Nat. ord., *Polygalaceæ*). Odor slight, acid, unpleasant; taste sweetish, afterward acrid.

Habitat. United States.

Chief constituents. Senegin, polygallic acid.

## PREPARATIONS.

Extractum Senegæ Fluidum . . . . . 0.06-0.30 Cc. ℥j-v.  
 Syrupus Senegæ (20 per cent. fd. ext.) . . 1.90-3.75 Cc. 3½-i.  
 Syrupus Scillæ Compositus (see Scilla) . . 0.30-3.75 Cc. ℥v-3i.

## ACTION.

In small doses senega has a stimulating action. Large doses act as an irritant. It is eliminated by the bronchial mucous membrane, by the kidneys, and by the skin; during elimination it acts as an expectorant, a diuretic, or a diaphoretic. A large dose will cause emesis, but it is never used alone for its emetic effect (see syrupus scillæ compositus).

## USE.

Senega may be used in combination with other drugs, as a stimulating expectorant.

## KRAMERIA.

**Rhatany.**

The root of *Krameria Triandra* or *Krameria Ixina* (Nat. ord., *Polygalaceæ*). Odorless; very astringent.

Habitat. (1) Peru. (2) Savanilla.

Chief constituents. Kramero-tannic acid, and rhatania red.

## PREPARATIONS.

Extractum Krameriaë . . . . . 0.30-0.60 Gm. gr. v-x.  
 Extractum Krameriaë Fluidum . . . . . 0.60-1.25 Cc. ℥x-xx.  
 Syrupus Krameriaë (35 per cent. fd. ext.) . 1.90-3.75 Cc. 3½-i.  
 Tinctura Krameriaë (20 per cent. pulv.) . 1.90-3.75 Cc. 3½-i.  
 Trochisci Krameriaë, one = . . . . . 0.06 Gm. gr. i.

## ACTION.

Krameria has an astringent action.

## USE.

When a mild astringent is wanted, as in certain forms of pharyngitis, diarrhœa, etc., krameria may be used alone or in combination with other drugs.

## CAMBOGIA.

**Gamboge.**

A gum resin obtained from *Garcinia Hanburnii* (Nat. ord., *Guttiferæ*).

It occurs in cylindrical pieces, sometimes hollow in the centre, of a waxy lustre, orange-red in color; odorless; taste very acrid. It is partly soluble in alcohol, and in ether.

Habitat. China. Siam.

Chief constituent. Gambogic acid.

Dose: 0.03-0.12 Gm. gr ½-ij.

## ACTION AND USE.

Gamboge has the action of a drastic, hydragogue cathartic, causing violent irritation throughout the alimentary canal, attended by vomiting, griping and purging. It has no action on the liver.

Gamboge is too drastic for use alone. It is one of the ingredients of the compound cathartic pill (see colocynth).

## Φ GURJUN.

**Gurjun Balsam.** Wood oil.

An oleo-resin obtained from *Dipterocarpus turbinatus* (Nat. ord., *Dipterocarpeæ*). This is a thick, viscid balsam, with a bitter taste and a copaiba like odor.

Habitat. The East Indies.

Chief constituents. A volatile oil, and gurjunic acid.

Dose: 0.30–1.90 Cc. M<sub>v</sub>–xxx.

## ACTION.

Stimulant, antiseptic, irritant. Large doses may cause nausea, vomiting and diarrhoea. Its antiseptic and stimulant action can be secured by local application; also along the lines of elimination—the urinary tract, the skin, the bronchial mucous membrane.

## USE.

Gurjun balsam has been used in the treatment of gonorrhoea after the acute stage has passed. It has been highly recommended both locally, (1 part of the oil with 3 of lime water) and internally, in the treatment of leprosy.

## ALTHÆA.

**Marshmallow.**

The root of *Althæa officinalis* (Nat. ord., *Malvaceæ*). It has a faint, aromatic odor; a sweetish, mucilaginous taste.

Chief constituents. Mucilage, and sugar.

Dose: Syrupus althææ (5 per cent.) 3.75–15.00 Cc. ʒi–iv.

## ACTION.

Emollient.

## USE.

As an emollient, in disease of the mouth or pharynx.

## GOSSYPIUM PURIFICATUM.

**Purified Cotton.** Absorbent Cotton.

The hairs of the seeds of *Gossypium herbaceum*, and of other species of *Gossypium* (Nat. Ord., *Malvaceæ*), freed from adhering impurities, and

deprived of fatty matter. It occurs in white, soft, fine filaments; insoluble in ordinary solvents. It should readily absorb water.

Habitat. Africa, Asia, America.

#### ACTION.

Absorbent cotton acts as a mechanical protectant.

#### USE.

It may be used to exclude air in the dressing of burns, and in surgical practice.

### PYROXYLINUM.

**Pyroxylin.** Soluble Gun Cotton. Colloxylin.

Prepared by treating cotton with nitric acid, sulphuric acid, etc. It is kept as small, detached pellets, loosely packed in well-closed vessels, in a cool, dry place, remote from lights or fire.

#### USE.

Pharmaceutical.

### COLLODIUM.

#### Collodion.

This is prepared by treating pyroxylin, 3 parts; with ether, 75 parts; and alcohol, 25 parts. It is a clear, viscid liquid which should be kept in cork-stoppered bottles, in a cool place, remote from lights or fire.

#### PREPARATIONS.

Collodium Cantharidatum . . . . .	} For external use.
Collodium Flexile . . . . .	
Collodium Stypticum . . . . .	

Flexile collodion has Canada turpentine 5 parts, and castor oil 3 parts, with collodion 92 parts.

Styptic collodion has tannic acid 20 parts, alcohol 5 parts, ether 25 parts, with collodion to 100 parts.

Cantharidal collodion has 60 parts of cantharides, with flexile collodion to 100 parts.

#### ACTION.

Collodion has a constringing, and a protectant action.

#### USE.

It may be used as a substitute for adhesive plaster over small wounds. It may also be used to relieve pain, by the steady pressure it exerts over an inflamed part.

The cantharidal collodion is used for blistering purposes (see cantharis).

## OLEUM GOSSYPII SEMINIS.

## Cotton Seed Oil.

A fixed oil expressed from the seeds of *Gossypium herbaceum*, and of other species of *Gossypium* (Nat. ord., *Malvaceæ*), and subsequently purified. It should be kept in well-closed vessels.

A pale yellow, oily liquid, without odor, and having a bland, nut-like taste. Sp. gr.: 0.920 to 0.930 at 15° C. Sparingly soluble in alcohol.

## ACTION.

Cotton seed oil has a demulcent and a protective action.

## USE.

Pharmaceutically, in preparing liniments.

Therapeutically, as a protective dressing for burns, etc.

## GOSSYPII RADICIS CORTEX.

## Cotton Root Bark.

The bark of the root of *Gossypium herbaceum*, and of other species of *Gossypium* (Nat. ord., *Malvaceæ*). It is odorless. The taste is slightly acrid, and faintly astringent.

Chief constituents. An acid resin, a fixed oil, and tannin.

## PREPARATIONS.

Extractum Gossypii Radicis Fluidum . . . . 1.90— 3.75 Cc. ʒ½-i.

Φ Infusum Gossypii Radicis Cortex . . . . 120.00—240.00 Cc. ʒiv-viiij.

## ACTION.

Cotton root bark has an emmenagogue, and oxytotic action. (It resembles ergot in action).

## USE.

It may be used to stimulate normal uterine contractions.

## Φ KOLA.

The seeds of *Cola Acuminata* (Nat. ord., *Sterculiaceæ*). The odor is slightly mustard-like. Taste not disagreeable.

Habitat. Western tropical Africa.

Chief constituents. Caffeine, and theobromine.

## PREPARATION.

Extractum Kolæ Fluidum, . . . . 0.60—1.90 Cc. ℥x-xxx.

## ACTION.

Kola has the action of a stimulant upon the nervous system. It increases the heart's force, and increases arterial tension. Through the



increased arterial tension, it produces diuresis. It favors digestion, either by increasing gastric secretion, or by action upon the muscular coat of the stomach, thus increasing gastric peristalsis. It controls intestinal secretion and gives tone to the intestinal muscular coat in relaxed conditions.

#### USE.

Kola may be used to strengthen a weak heart. It may be used as a diuretic, in cases of dropsy attending cardiac lesion; in atonic gastric dyspepsia; in subacute or chronic diarrhoea. It may be used after the manner of coffee, or caffeine, to prevent fatigue.

#### Φ THEOBROMA.

**Cacao.** Chocolate nut.

The seeds of the *Theobroma Cacao* (Nat. ord., *Sterculiaceæ*). These have an agreeable odor; a bitter, oily taste.

Habitat. Mexico, Central, and South America.

Chief constituents. Caffeine, and theobromine.

#### ACTION.

The action, due to its active constituents, caffeine and theobromine, closely resembles that described for kola.

#### USE.

Chiefly as a beverage.

#### Φ OLEUM THEOBROMATIS.

**Oil of Theobroma,** Butter of Cacao.

A fixed oil, expressed from the seeds of *Theobroma Cacao* (Nat. ord., *Sterculiaceæ*).

Chief constituents. Olein, and stearin.

A yellowish-white solid, having a faint, agreeable odor, and a bland, chocolate-like taste. Sp. gr.: 0.970–0.980, at 15° C. Soluble in ether, chloroform, and boiling absolute acid. Its reaction is neutral.

#### ACTION.

Demulcent.

#### USE.

• Pharmaceutical, in making suppositories.

#### LINUM.

**Linseed.** Flaxseed.

The seeds of *Linum usitatissimum* (Nat. ord., *Linaceæ*). Odorless; taste mucilaginous, oily, and bitter.

Habitat. Southern Europe.

Chief constituents. Mucilage, and a fixed oil.

## ACTION.

Demulcent.

## USE.

The meal is used in making poultices.

An infusion made from the seeds may be used as a demulcent, soothing drink in the treatment of pharyngitis.

## OLEUM LINI.

**Linseed Oil.** Flaxseed oil.

A fixed oil, expressed from linseed without the use of heat.

A yellowish, or yellow, oily liquid, having a slight, peculiar odor, a bland taste, and a neutral reaction. Soluble in 5 parts of absolute alcohol, and in 1.5 parts of ether. Sp. gr.: 0.930 to 0.940 at 15° C.

Chief constituents. Linolein, with palmitin.

## ACTION.

Demulcent, protective.

## USE.

Linseed oil may be used as a local, protective dressing, alone, or combined with lime water ("Carron oil"), in the treatment of burns, etc.

## SAPO MOLLIS.

**Soft Soap.** Green soap of Pharm., 1880.

This is prepared from potassa, and linseed oil.

It is a soft, unctuous mass of a yellowish-brown, or brownish-yellow, color, having a peculiar, characteristic odor, a disagreeable, alkaline taste, and an alkaline reaction. Soluble in water, and in alcohol.

## PREPARATION.

Linimentum Saponis Mollis, . (65 per cent.). For external use.

## ACTION.

That of an antacid, a local stimulant, and a detergent.

## USE.

Soft soap is used in general surgery for its cleansing properties; in certain diseases of the skin for its cleansing properties; also for its local stimulating action.

## COCA.

The leaves of *Erythroxylon Coca* (Nat. ord., *Lineæ*). Odor, slight and tea-like; taste, somewhat aromatic and bitter. When chewed, coca benumbs the lips and tongue.

Habitat. South America.

Chief constituent. Cocaine.

## PREPARATION.

Extractum Cocæ Fluidum . . . . . 3.75-7.50 Cc. ʒi-ij.

## ACTION.

The action of coca is represented by its alkaloid cocaine. See Cocainæ Hydrochloras.

**COCAINÆ HYDROCHLORAS.**  $C_{17}H_{21}NO_4HCl$ .

**Cocaine Hydrochlorate.**

This is the hydrochlorate of an alkaloid obtained from coca.

It occurs in colorless, transparent crystals, or as a white, crystalline powder; without odor; of a saline, slightly bitter taste, and producing upon the tongue a tingling sensation, followed by numbness of some minutes' duration. Permanent in the air. Soluble, at 15° C., in 0.40 parts of water, and in 3.5 parts of alcohol. Its reaction is neutral.

Dose: 0.01-0.03 Gm. gr.  $\frac{1}{6}$ - $\frac{1}{2}$ .

## ACTION.

Cocaine paralyzes the peripheral sensory nerves when used locally, and acts as a local anæsthetic. It also acts upon the vaso-motor system, first, as a stimulant causing marked contraction of blood-vessels; this is followed by paralysis, with dilatation of the vessels, and congestion of the parts which they supply.

It causes marked dilatation of the pupil, through peripheral stimulation of the sympathetic in the iris, thus producing excessive action of the dilators. (Atropine causes paralysis of the sphincters.) It is possible that dilatation of the pupil may be due in part, or entirely, to the effect produced upon the arterioles of the iris.

Internally, small doses stimulate, and large doses paralyze, the nerve centres. There is a direct stimulant action upon the muscles, and this lessens fatigue. Respiration is stimulated, then paralyzed by large doses, and death may come from paralysis of respiration. Small doses slow the pulse, probably by stimulating the vagus. Arterial tension is increased through stimulation of the vaso-motor system. Small doses increase peristalsis; probably through stimulation of the vagus. Large doses diminish peristalsis, by paralyzing the intestinal ganglia. The secretion of saliva, sweat, milk, and of mucous glands in general, is diminished; probably through paralysis of the secreting nerve fibres.

## USE.

Cocaine is used to produce local anæsthesia, and thus relieve, or prevent, pain.

It may be used internally, as a stimulant, but the danger of forming the drug "habit" must always be kept in mind.

### GUAIACI LIGNUM.

**Guaiac Wood.** Lignum Vitæ.

The heart-wood of *Guaiacum officinalis* and of *Guaiacum Sanctum* (Nat. ord., *Zygophylleæ*). When heated this has a balsamic odor. The taste is slightly acrid.

Habitat. West Indies, and northern South America.

Chief constituent. A resin.

### GUAIACI RESINA.

**Guaiac.**

The resin of the wood *Guaiacum officinalis* (Nat. ord., *Zygophylleæ*).

This occurs in irregular masses, greenish-brown, or reddish-brown, fusible, feebly aromatic, somewhat acrid. Powdered it is grayish, turning green on exposure to air. Soluble in solutions of potassa, and in alcohol.

### PREPARATIONS.

Guaiaci Resina (powdered) . . . . 0.30-0.95 Gm. gr. v-xv.

Tinctura Guaiaci (20 per cent.) . . . 1.90-3.75 Cc. 3½-j.

Tinctura Guaiaci Ammoniata (20 per

cent.) . . . . . 1.90-3.75 Cc. 3½-j.

### ACTION.

Guaiac acts as a stimulant and irritant to the parts with which it is brought in contact, and also along the lines of elimination. It may thus exercise a diaphoretic, diuretic, laxative, or alterative action. This is a drug that has been very much overrated, and one whose beneficial qualities can all be found in some more agreeable form.

### USE.

Guaiac is used in the treatment of tonsillitis. It is also sometimes used as an alterative, in the treatment of chronic rheumatism, syphilis, etc.

### GERANIUM.

**Cranes-bill.** Spotted Geranium.

The rhizome of *Geranium maculatum* (Nat. ord., *Geraniaceæ*). Odorless; taste strongly astringent.

Chief constituents. Tannic, and gallic acids.

### PREPARATION.

Extractum Geranii Fluidum . . . . . 1.90-3.75 Cc. 3½-j.

## ACTION.

Astringent.

## USE.

Geranium may be used where astringents are indicated, in diseases of the alimentary canal. It is an unimportant drug.

## XANTHOXYLUM.

## Prickly Ash.

The bark of *Xanthoxylum americanum* and of *Xanthoxylum Clava-Herculis* (Nat. ord., *Rutaceæ*). Odorless; taste bitter.

Habitat. United States.

Chief constituents. Volatile oil, tannic acid, and resins.

## PREPARATION.

Extractum Xanthoxyli Fluidum . . . . 1.90-3.75 Cc.  $3\frac{1}{2}$ -i.

## ACTION.

In action this drug resembles guaiac.

## USE.

This drug is of little therapeutic value and is seldom used.

## BUCHU.

The leaves of the *Barosma betulina* and *Barosma crenulata* (Nat. ord., *Rutaceæ*). Odor, and taste, strongly aromatic, mint-like, pungent, and bitterish.

Habitat. South Africa.

Chief constituents. A volatile oil, and a bitter substance.

## PREPARATIONS.

Extractum Buchu Fluidum . . . . . 1.90-3.75 Cc.  $3\frac{1}{2}$ -i.

## ACTION.

That of a stimulant and irritant. Large doses will cause a burning sensation in the stomach, and irritation throughout the urinary tract; vomiting, purging, and strangury. Its activity depends upon the volatile oil which is eliminated chiefly by the kidneys. During its elimination it acts as a stimulating diuretic, and possibly as an antiseptic along the urinary tract.

## USE.

Buchu may be used as a diuretic in combination with some saline diuretic.

## PILOCARPUS.

## Jaborandi.

The leaflets of *Pilocarpus Selloanus* and *Pilocarpus Jaborandi* (Nat. ord., *Rutaceæ*). Taste bitter and pungent; odor aromatic.

Habitat. Brazil.

Chief constituents. Pilocarpine, and jaborine.



## PREPARATION.

Extractum Pilocarpi Fluidum . . . 0.95-1.90 Cc. ℥ xv-xxx.

## ACTION AND USE.

This is described under pilocarpinæ hydrochloras.

**PILOCARPINÆ HYDROCHLORAS.**  $C_{11}H_{16}N_2O_2HCl$ .

**Hydrochlorate of Pilocarpine.**

This is the hydrochlorate of an alkaloid obtained from pilocarpus. It should be kept in small, well-stoppered vials.

It occurs as small white crystals; odorless, having a faintly bitter taste, and a neutral reaction. Soluble in water, and in alcohol.

## ACTION.

Pilocarpine stimulates the nerves supplying certain glands. It may also have a direct stimulating action on the secreting cells. It thus causes an enormous secretion of sweat, or of saliva, or of both. It also increases other secretions, as of the bronchial and nasal mucous membranes, the lachrymal glands, the kidneys, the intestinal mucous membrane, and sometimes the mammary gland. It stimulates the growth of hair.

It stimulates nerves, supplying involuntary muscular fibre; causing in the eye contraction, by stimulating the terminations of the third nerve; in the intestines, increased peristalsis through stimulation of the intestinal ganglia; in the stomach, contraction attended by belching; in the bladder, contraction attended by a desire for frequent micturition; in the uterus, contraction.

It is a cardiac depressant, but this depression is preceded by a short period of stimulation. The pulse is quickened, the vagus ends being paralyzed; the blood-vessels are dilated, the result of vaso-motor paralysis, and there is a fall of blood-pressure with the diminished arterial tension. The effect on respiration is probably only secondary. There may be dyspnoea, due to cardiac failure; or apnoea, due to the excessive bronchial secretion. The temperature falls as a result of heat dissipation. Elimination takes place through the kidneys.

## USE.

Locally, it may be used in some forms of alopecia.

Internally, small doses (0.002 Gm., gr.  $\frac{1}{30}$ ) may be used with expectorants, to increase bronchial secretion in subacute, or chronic, bronchitis. The same dose may sometimes be of benefit in checking the sweating so often present in debilitated conditions. In suppression of urine due to nephritis it may be of marked benefit, through its action upon the sweat

glands, causing profuse diaphoresis; and also through the lowering of blood-pressure, thus doubly relieving the strain upon the kidneys.

#### Φ BELA.

**Bael Fruit.** Bengal quince.

This is the fruit of the *Ægle Marmelos* (Nat. ord. *Rutaceæ*). It is nearly odorless, and has a mucilaginous, slightly bitter taste.

**Habitat.** The Himalaya mountains.

**Chief constituents.** Mucilage, a bitter principle, and a volatile oil.

#### PREPARATION.

Extractum Belæ Fluidum . . . . . 1.90–7.50 Cc. ʒ½–ij.

#### ACTION.

Bael fruit probably has an action similar to that of coto, increasing intestinal absorption. It is not astringent.

#### USE.

It may be used in dysentery, diarrhoea, etc. This drug is of little use, except in its native country. The preparations, to be efficient, must be made from the fresh fruit.

#### AURANTII AMARI CORTEX.

**Bitter Orange Peel.**

The rind of the fruit of *Citrus vulgaris* (Nat. ord., *Rutaceæ*). This has a fragrant odor, and an aromatic, bitter taste.

#### PREPARATIONS.

Extractum Aurantii Amari Fluidum . . 0.95–1.90 Cc. ℥xv–xxx.

Tinctura Aurantii Amari (20 per cent.) 3.75–7.20 Cc. ʒi–ij.

#### ACTION.

All of the orange preparations, so far as they have any action, are stimulating, and carminative.

#### USE.

The orange preparations are used chiefly as flavoring ingredients, or as vehicles.

#### AURANTII DULCIS CORTEX.

**Sweet Orange Peel.**

The rind of the fruit of *Citrus Aurantium* (Nat. ord., *Rutaceæ*). This has a fragrant odor, and an aromatic, bitter taste.

#### PREPARATIONS.

Syrupus Aurantii . . . . . 1.90–3.75 Cc. ʒ½–i.

Tinctura Aurantii Dulcis (20 per cent.) . . 3.75–7.50 Cc. ʒi–ij.

## OLEUM AURANTII CORTICIS.

## Oil of Orange Peel.

A volatile oil obtained by expression from the fresh peel of either the bitter orange, *Citrus vulgaris*, or the sweet orange, *Citrus Aurantium*. It is a pale, yellowish liquid, having the characteristic, aromatic odor of orange, and an aromatic taste. Sp. gr.: 0.850 at 15° C.

## PREPARATIONS.

Spiritus Aurantii (5 per cent.) . . . . .	} For flavoring purposes.
Spiritus Aurantii Compositus (20 per cent.) . . . . .	
Elixir Aromaticum . . . . .	
Spiritus Myrcæ . . . . .	

## OLEUM AURANTII FLORUM.

## Oil of Orange Flowers. Oil of Neroli.

A volatile oil distilled from the fresh flowers of the bitter orange, *Citrus vulgaris*.

It is a yellowish, or brownish, thin liquid, having the very fragrant odor of orange flowers, and an aromatic, somewhat bitter taste. Sp. gr.: 0.875 to 0.890 at 15° C.

## PREPARATIONS.

Aqua Aurantii Florum Fortior . . . . .	For pharmaceutical use.
Aqua Aurantii Florum . . . . .	} For flavoring purpose.
Syrupus Aurantii Florum . . . . .	

## LIMONIS SUCCUS.

## Lemon Juice.

The freshly expressed juice of the ripe fruit of *Citrus Limonum* (Nat. ord., *Rutaceæ*).

This is a slightly turbid, yellowish liquid, usually having an odor of lemon, due to the residential presence of some of the volatile oil of the rind. Taste acid and slightly bitter. Sp. gr.: not less than 1.030 at 15° C.

## ACTION.

Anti-scorbutic, refrigerant, diuretic.

Dose, *pro re nata*.

## USE.

Lemon juice may be used both as a prophylactic and curative agent, for scurvy. It is also used as a refreshing, acid drink in fevers.

## LIMONIS CORTEX.

## Lemon Peel.

The rind of the recent fruit of *Citrus Limonum* (Nat. ord., *Rutaceæ*). Odor fragrant; taste aromatic and bitter.

Chief constituent. A volatile oil obtained by mechanical means.

## PREPARATIONS.

Spiritus Limonis (5 per cent.) . . . . . For flavoring purposes.  
 Syrupus Acidi Citrici . . . . . See Citric Acid.

## ACTION.

Stimulant and carminative.

## USE.

For pharmaceutical purposes.

## OLEUM LIMONIS.

## Oil of Lemon.

A volatile oil obtained by expression from fresh lemon peel. It is a pale-yellow, limpid liquid, having the fragrant odor of lemon, and an aromatic, somewhat bitter taste. Sp. gr.: 0.858 to 0.859 at 15° C.

## PREPARATIONS.

Spiritus Aurantii Compositus, (5 per cent.). For flavoring purposes.  
 Spiritus Limonis, (5 per cent.).

## ACTION.

Stimulant and carminative.

## USE.

Pharmaceutically, as a flavoring agent.

## OLEUM BERGAMOTTÆ.

## Oil of Bergamot.

A volatile oil obtained by expression from the rind of the fresh fruit of *Citrus Bergamia* (Nat. ord., *Rutaceæ*).

## ACTION.

Stimulant, carminative.

## USE.

Pharmaceutically, as a perfume.

## QUASSIA.

## Bitter Ash. Bitter Wood.

The wood of *Picræna Excelsa* (Nat. ord., *Simarubeæ*). This is odorless, and has an intensely bitter taste.

Habitat. Jamaica.

Chief constituent. Quassin,  $C_{32}H_{44}O_{10}$ , a crystallizable bitter principle. Sparingly soluble in water; soluble in alcohol, and in chloroform.

## PREPARATIONS.

Extractum Quassiae . . . . .	0.06-0.12 Gm. gr. j-ij.
Extractum Quassiae Fluidum . . . . .	0.30-0.60 Cc. gr. v-x.
Tinctura Quassiae, (10 per cent). . . . .	1.90-3.75 Cc. 3½-j.

## ACTION.

That of a bitter tonic. It contains no tannic acid.

## USE.

An infusion of quassia, may be used by enema, to destroy thread worms.

Internally, quassia may be used to increase the appetite, and to aid digestion during the convalescence from acute diseases; also in some forms of dyspepsia.

## MYRRHA.

**Myrrh.**

A gum resin obtained from the *Commiphora Myrrha* (Nat. ord., *Burseraceæ*).

This occurs in irregular, or roundish tears, or masses of a dusty, brownish-yellow color; odor balsamic; taste aromatic, and bitter.

Habitat. Eastern Africa, and Arabia.

Chief constituents. A resin, and a volatile oil.

## PREPARATIONS.

Mistura Ferri Composita . . . . .	See Ferrum.
Pilulæ Aloes et Myrrhæ, }	. . . . . See Aloes.
Tinctura Aloes et Myrrhæ, }	
Tinctura Myrrhæ, (20 per cent.) . . . . .	0.30-0.95 Cc. ℥ v-xv.

## ACTION.

Myrrh has the action of a local stimulant, and disinfectant; in large doses, a local irritant. It also acts as a stimulant along the lines of elimination, when given internally, viz.: upon the bronchial mucous membrane, and throughout the urinary tract. It is supposed to be a uterine stimulant, and emmenagogue.

## USE.

At the present time the use of myrrh is very limited.

## Φ COCCILLANA.

The bark of an undetermined species of *Guarea* (Nat. ord., *Meliaceæ*). This has a peculiar odor, with a slightly nauseous, unpleasant taste.

Habitat. Bolivia.

Chief constituents. An alkaloid (?), resins, and tannic acid.



## PREPARATION.

Extractum Coccillanæ Fluidum, . . . 0.30-1.90 Cc. Mv-xxx.

## ACTION.

Coccillana resembles ipecac in action. It is irritant locally, and along the lines of elimination. In small doses it increases secretion throughout the alimentary canal, thus increasing the appetite, and also producing a mild laxative effect. It increases bronchial secretion, thus acting as an expectorant. Large doses cause nausea, vomiting, and catharsis.

## USE.

This is a comparatively new drug, and its therapeutic use is by no means fully established. So far, it has shown itself to be a useful expectorant.

## EUONYMUS.

**Wahoo.** Spindle Tree. Burning Bush.

Bark of *Euonymus atropurpureus* (Nat. ord.: *Celastrineæ*). This is odorless, with a somewhat bitter, acrid taste.

Habitat. United States.

Chief constituents. Euonymin, atropurpurin, and a fixed oil.

## PREPARATIONS.

Extractum Euonymi, . . . . . 0.06-0.18 Gm. gr. i-ij.

ϕ "Euonymin," . . . . . 0.03-0.06 Gm. gr. ½-j.

## ACTION.

A laxative of mild character, usually. A large dose may act as an irritant in the intestinal canal, causing profuse watery discharges. It is an hepatic stimulant, increasing the secretion of bile.

## USE.

It may be used when the action of an hepatic stimulant and a mild laxative is wanted, as in chronic constipation. It is generally used in combination with other laxatives.

## FRANGULA.

**Buckthorn.**

The bark of the *Rhamnus Frangula* (Nat. ord., *Rhamnææ*), collected at least one year before being used. This is nearly odorless, and has a bitter taste.

Habitat. Europe, and Asia.

Chief constituents. Frangulin, and tannic acid.

Frangulin ( $C_{20}H_{20}O_{10}$ ), a glucoside, occurs in fine yellow crystals; odorless and tasteless. Insoluble in water; sparingly soluble in alcohol.

## PREPARATION.

Extractum Frangulæ Fluidum, . . . . 0.30-1.25 Cc. ℥ v-xx.

## ACTION.

The frangulin which is found in the fresh bark is changed by time into *emodin* ( $C_{15}H_{10}O_5$ ), and it is this that gives the official (old) bark the desired physiological action, namely: that of a mild, stimulating laxative. It increases secretion, and increases intestinal peristalsis. Large doses cause nausea, vomiting, and catharsis.

## USE.

This is an excellent laxative for use in the treatment of chronic constipation. Its tonic influence upon the intestines prevents the constipation which usually follows the use of laxatives. It is not suitable for use as a cathartic.

## RHAMNUS PURSHIANA.

**Cascara Sagrada.** California Buckthorn. Sacred Bark.

The dried bark of the *Rhamnus Purshiana* (Nat. ord., *Rhamnaceæ*), collected at least two years before being used. Odorless, taste bitter.

Habitat. Western United States.

Chief constituents. A volatile oil, a red, a yellow, and a brown resin; also a neutral crystalline substance (resembling frangulin, but probably not identical with it).

## PREPARATIONS.

Φ Cascara Cordial. . . . . 1.90-3.75 Cc. 3½-i.

Φ Extractum Cascaræ Sagradæ . . . . . 0.06-0.30 Gm. gr. i-v.

Extractum Rhamni Purshianæ Fluidum . 0.30-1.25 Cc. ℥ v-xx.

## ACTION.

As with frangula, the composition changes with age, and the bark which was irritant and disagreeable when fresh, has a mild laxative action when kept the proper length of time. It is possibly more active and more certain in its action than frangula. Emodin has been found in bark a year old.

## USE.

This, like frangula, is used in chronic constipation, as a laxative, and as an intestinal tonic.

## GUARANA.

A dried paste chiefly consisting of the crushed or pounded seeds of *Paullinia sorbilis* (Nat. ord., *Sapindaceæ*). This occurs in subglobular, or elliptic cakes, or cylindrical sticks. It is hard, dark reddish-brown in

color. The odor is slight, resembling that of chocolate; taste astringent and bitter.

Habitat. Brazil.

Chief constituent. Caffeine, *q. v.*

#### PREPARATIONS.

Guarana . . . . . 0.30-1.90 Gm. gr. v-xxx.

Extractum Guaranæ Fluidum . . . . 0.30-1.90 Cc. ℥ v-xxx.

#### ACTION.

Guarana depends upon its chief constituent, caffeine, for its action. It is therefore tonic and stimulant (see caffeine).

#### USE.

Therapeutically, it has been quite generally displaced by caffeine. It may be used in the treatment of certain forms of headaches.

#### MASTICHE.

##### Mastic.

A concrete resinous exudation from *Pistacia Lentiscus* (Nat. ord., *Anacardiæ*). It has a weak, somewhat balsamic, resinous, odor, and a mild terebinthinate taste.

Chief constituents. A resin, and a volatile oil.

#### PREPARATION.

Pilulæ Aloes et Mastiches . . . . . See aloes.

#### ACTION AND USE.

This drug has but little, if any, therapeutic value, and is seldom used.

#### RHUS GLABRA.

##### Sumach. Upland Sumach.

The fruit of *Rhus Glabra* (Nat. ord., *Anacardiæ*). Odorless, with an acid taste.

Habitat. North America.

Chief constituent. Tannic acid.

#### PREPARATION.

Extractum Rhois Glabræ Fluidum . . . . . For local use.

#### ACTION.

That of tannic acid, *q. v.*

#### USE.

This may be used as an astringent gargle, or mouth wash, as required.

**RHUS TOXICODENDRON.**

**Poison Ivy.** Poison oak. Mercury vine.

The fresh leaves of the *Rhus radicans* (Nat. ord., *Anacardiæ*). Odorless; taste somewhat astringent, and acrid.

Habitat. North America.

Chief constituents. Toxicodendric acid (volatile), tannic acid, and a fixed oil.

**PREPARATION.**

∅ Tinctura Rhois Toxicodendri . . . . 0.005-0.12 Cc. ℥ $\frac{1}{2}$ -ij.

**ACTION.**

Stimulant and irritant locally. When used internally there is irritation throughout the alimentary canal, and along the lines of elimination.

**USE.**

This is a drug of questionable therapeutic value. It may be used in certain chronic skin diseases; it may be used in incontinence of urine dependent upon atony of the bladder, etc.

**GLYCYRRHIZA.**

**Liquorice Root.**

The root of the *Glycyrrhiza glabra* (Nat. ord., *Leguminosæ*). The taste is sweet, and somewhat acrid.

Habitat. Southern Europe, and Western Asia.

Chief constituents. Starch, sugar, and glycyrrhizin.

**PREPARATIONS.**

Extractum Glycyrrhizæ . . . . .	} For flavoring.
Extractum Glycyrrhizæ Purum . . . . .	
Extractum Glycyrrhizæ Fluidum . . . . .	
Trochisci Glycyrrhizæ et Opii. . . . .	See Opium.
Pulvis Glycyrrhizæ Compositus . . . . .	See Senna.
Mistura Glycyrrhizæ Composita . . . . .	3.75-7.50 Cc. ʒi-ij.
Glycyrrhizinum Ammoniatum . . . . .	0.30-0.95 Gm. gr. v-xv.

**Mistura Glycyrrhizæ Composita.** (Brown Mixture.) This contains extract of liquorice pure 3 parts, mucilage 10 parts, syrup 5 parts, spirits of nitrous ether 6 parts, wine of antimony 6 parts, paregoric 12 parts, water to 100 parts.

**ACTION.**

Demulcent, and mildly laxative.

**USE.**

The many preparations of liquorice are used chiefly as vehicles, to disguise the flavor of certain drugs, especially that of quinine.

## HÆMATOXYLON.

**Logwood.**

The heart wood of the *Hæmatoxylon campechianum* (Nat. ord., *Leguminosæ*). Odor faint, and agreeable; taste sweetish, and astringent.

Habitat. Honduras. Jamaica.

Chief constituents. Tannic acid, hæmatoxylin.

Hæmatoxylin,  $C_{16}H_{14}O_6$ , occurs in colorless, sweet crystals. Soluble in water, and in alcohol.

## PREPARATION.

Extractum Hæmatoxyli . . . . . 0.60–1.90 Gm. gr. x-xxx.

## ACTION.

Logwood has the action of a mild astringent.

## USE.

It may be used in diarrhœa, when astringents are indicated. It colors the urine red, and may thus be a source of needless alarm, unless attendants have been informed as to this fact.

## SANTALUM RUBRUM.

**Red Saunders.**

The wood of the *Pterocarpus santalinus* (Nat. ord., *Leguminosæ*). Nearly odorless; nearly tasteless.

Chief constituent. Santalin (a coloring agent).

## ACTION AND USE.

This is a coloring agent, which has some use pharmaceutically.

## SENNÆ.

The leaflets of *Cassia acutifolia* (Alexandria senna) and of *Cassia angustifolia* (Indian senna) (Nat. ord., *Leguminosæ*). These have a somewhat peculiar odor, and a nauseous, bitter taste.

Habitat. Africa, and India.

Chief constituent. Cathartic acid.

## PREPARATIONS.

Confectio Sennæ . . . . . 3.75– 7.50 Gm. ʒi–ij.

Extractum Sennæ Fluidum . . . . . 3.75– 7.50 Cc. ʒi–ij.

Infusum Sennæ Compositum . . . . . 60.00–120.00 Cc. ʒij–iv.

Syrupus Sennæ (25 per cent.) . . . . . 3.75– 7.50 Cc. ʒi–ij.

Pulvis Glycyrrhizæ Compositus . . . . . 1.90– 3.75 Gm. ʒ½–i.

Syrupus Sarsaparillæ Compositus . . . . . See Sarsaparilla.

**Confectio Sennæ** = senna 10, cassia 16, tamarind 10, prune 7, and fig 12 parts in 100.



**Infusum Sennæ Compositum** (Black Draught) = senna 16, manna 12, magnesium sulphate 12, and fennel 2 parts in 100.

**Pulvis Glycyrrhizæ Compositus** = senna 18, licorice 24, oil of fennel  $\frac{1}{2}$ , washed sulphur 8, and sugar to 100 parts.

#### ACTION.

Senna acts as a cathartic, by increasing secretion, and increasing peristalsis. Its action is chiefly on the upper part of the small intestine, and it causes considerable griping. It may cause discoloration of the urine.

#### USE.

Senna, in its many preparations, may be used as a laxative, or as a cathartic. It is seldom, if ever, used alone.

#### SCOPARIUS.

##### Broom.

The tops of *Cytisus Scoparius* (Nat. ord., *Leguminosæ*). These have a peculiar odor when bruised; taste very bitter.

Habitat. Europe, Asia, and America.

Chief constituents. Spartein, scoparin, a volatile oil, and tannic acid.

#### PREPARATIONS.

Extractum Scoparii Fluidum . . . . .	0.30–0.95 Cc. ℥v–xv.
Φ Decoctum Scoparii . . . . .	15.00–30.00 Cc. ℥ $\frac{1}{2}$ –i.

#### ACTION.

Scoparius has the action of a diuretic, and a cardiac tonic. The action is more fully described under scoparius and sparteine, *q. v.*

#### USE.

Scoparius may be used as a diuretic in certain forms of dropsy.

#### Φ SCOPARIN. $C_{21}H_{22}O_{10}$ .

This is a neutral, crystalline principle from the *Cytisus Scoparius*. It is freely soluble in water, and in alcohol. It has a pale yellow color; is odorless, and tasteless.

Dose: 0.06–0.30 Gm., gr. i–v.

#### ACTION.

Scoparin is supposed to be a true diuretic; that is, a diuretic that increases secretion directly through its action in the kidneys.

#### USE.

It is used—chiefly as a constituent of scoparius—for its diuretic action in certain forms of dropsy.

**SPARTEINÆ SULPHAS.**  $C_{15}H_{26}N_2H_2SO_4 + 4H_2O$ .**Sparteine Sulphate.**

This is the neutral sulphate of an alkaloid obtained from *Scoparius*.

It occurs in colorless crystals, or as a granular powder; odorless, having a saline, slightly bitter taste, and a neutral reaction. Very soluble in water, and in alcohol.

Dose: 0.01–0.03 Gm. gr.  $\frac{1}{6}$ – $\frac{1}{2}$ .

**ACTION.**

Sparteine resembles *digitalis* in its action on the circulation. It stimulates the cardiac muscle, and the inhibitory apparatus, thus slowing the heart's action. Large doses cause paralysis of the heart muscle, and exhaustion of the inhibitory apparatus; this gives rise to a rapid, irregular, feeble heart's action. Small doses stimulate the vaso-motor centre, and cause contraction of the arterioles in general, and of the splanchnic vessels in particular, thus increasing the circulation in the kidneys and in the skin. Its diuretic action depends upon this property, and is generally supposed to be effective only when cardiac disease exists. Sparteine has no cumulative action, neither does it interfere with digestion, nor cause disturbance of the general nervous system. In all these points it has an advantage over *digitalis*.

**USE.**

Sparteine may be employed as a cardiac tonic, or as a diuretic, in all cases adapted to the use of *digitalis*.

**CASSIA FISTULA.****Purging Cassia.**

The fruit of the *Cassia fistula* (Nat. ord., *Leguminosæ*). The odor resembles that of prunes; the taste is sweetish.

Habitat. Upper Egypt, and India.

Chief constituent. Sugar.

Dose: 3.75–7.50 Gm.  $\text{ʒi}$ – $\text{ij}$ .

**ACTION.**

Laxative. It causes severe griping pains.

**USE.**

Cassia is seldom used, as there are many laxatives superior to it in every way. It is an ingredient of the official *confectio sennæ*.

**TAMARINDUS.****Tamarind.**

The preserved pulp of the fruit *Tamarindus indica* (Nat. ord., *Leguminosæ*). This is odorless; the taste is sweetish, and acidulous.

Habitat. India, and Africa.

Chief constituents. Citric, tartaric, acetic, and malic acids, mostly as potassium compounds; grape sugar, and tannic acid.

Dose: 3.75–7.50 Gm. ʒi–ij.

ACTION.

Laxative.

USE.

Tamarind is seldom used alone. It is an ingredient of the official *confectio sennæ*.

#### PHYSOSTIGMA.

**Calabar-bean.** Ordeal-bean.

The seed of the *Physostigma venenosum* (Nat. ord., *Leguminosæ*). These are odorless, with a bean-like taste.

Habitat. Western Africa.

Chief constituents. Physostigmine (or eserine), Calabarine.

#### PREPARATIONS.

Extractum Physostigmatis . . . . 0.005–0.01 Gm. gr.  $\frac{1}{12}$ – $\frac{1}{6}$ .

Tinctura Physostigmatis (15 per cent.) 0.30–0.95 Cc. ℥v–xv.

ACTION.

A general paralyzant (see Physostigmina).

USE.

The use of physostigma is represented by physostigmina, *q. v.*

#### PHYSOSTIGMINA. $C_{15}H_{21}N_3O_2$ .

**Physostigmine.** Eserine.

This is an alkaloid obtained from the *Physostigma venenosum*. It is amorphous, and tasteless. Sparingly soluble in water; soluble in alcohol.

#### PREPARATIONS.

Physostigminæ Salicylas . . . . 0.0005–0.001 Gm. gr.  $\frac{1}{120}$ – $\frac{1}{60}$ .

Physostigminæ Sulphas . . . . 0.0005–0.001 Gm. gr.  $\frac{1}{120}$ – $\frac{1}{60}$ .

**Physostigminæ Salicylas**,  $C_{15}H_{21}N_3O_2 \cdot C_7H_6O_3$  (Eserine Salicylate). This occurs as colorless, or faintly yellowish crystals; odorless, having a bitter taste, and a slightly acid reaction. Soluble, at 15° C., in 150 parts of water, and in 12 parts of alcohol.

**Physostigminæ Sulphas**,  $(C_{15}H_{21}N_3O_2)_2 \cdot H_2SO_4$  (Eserine Sulphate). This is a white, or yellowish-white, micro-crystalline powder; odorless, having a bitter taste, and a neutral reaction. Very deliquescent. Very soluble, at 15° C., in water, and in alcohol.

## ACTION.

In medicinal doses physostigmine acts as a stimulant to unstriated muscular fibre. It slows the pulse by peripheral stimulation of the cardiac inhibitory nerves. It increases arterial pressure, partly through increased heart's action, partly through contraction of the arterioles. It increases peristalsis by stimulation of the muscular coat of the intestines. It causes contraction of the pupil, by peripheral stimulation of the oculo-motor nerves, or of the circular muscular fibres of the iris. It also diminishes intra-ocular tension.

It increases the secretion of the salivary, sweat, lachrymal, and mucous glands, by action on the secreting glands themselves. The chief result of this action in the intestinal canal is to aid the laxative action already present through increased peristalsis.

Elimination is chiefly by the kidneys, in an unchanged condition. Death, when it occurs, is through paralysis of the respiratory centre.

## USE.

Physostigmine may be used locally to cause contraction of the pupil; to antagonize the action of atropine; or to diminish intra-ocular tension.

Internally, it may be used to overcome atony of the muscular walls of the intestines, or of the bladder.

## TOXICOLOGY.

Toxic doses of physostigmine cause muscular tremors, followed by complete muscular relaxation, and debility. Salivation, nausea, and vomiting are sometimes present. There is a slow, feeble, and almost insensible pulse, with coldness of the extremities, and of the skin. Respiration becomes slow, feeble, and rattling, and finally ceases. Consciousness remains to the end. The whole chain of toxic symptoms is due to the immediate action of the drug upon the muscles, or upon the nervous branches supplying them, rather than to any action upon the cerebral, or spinal centres.

*Treatment.*—Atropine is a physiological antidote and should be used hypodermatically. Strychnine should be used as a respiratory and cardiac stimulant.

## CHRYSAROBINUM.

**Chrysarobin.**

A neutral principle in its commercial, more or less impure, form (commonly named chrysophanic acid). Extracted from Goa powder, a substance found deposited in the wood of the trunk of *Andira Araroba* (Nat. ord., *Leguminosæ*).

It occurs as a pale, orange-yellow, crystalline powder, permanent in the air; odorless, and tasteless. Almost insoluble in water; only slightly soluble in alcohol. Soluble in ether.

## PREPARATIONS.

Chrysarobinum, . . . . . 0.01-0.06 Gm. gr.  $\frac{1}{6}$ -i.  
 Unguentum Chrysarobini (5 per cent.). For external use.

## ACTION.

**Irritant.** It is a local "reducing" agent.

## USE.

It may be used locally in the treatment of certain forms of skin disease.

## ACACIA.

**Gum Arabic.**

A gummy exudation from *Acacia Senegal* (Nat. ord., *Leguminosæ*).

**Habitat.** Africa, etc.

**Chief constituents.** Arabic acid, combined with calcium, potassium, and magnesium.

This occurs in the form of tears or broken fragments, about the size of a pea. In color it is faintly yellow. It is odorless; taste mucilaginous, and insipid. Soluble in water; insoluble in alcohol.

## PREPARATIONS.

Mucilago Acaciæ (34 per cent.), . . . . . A vehicle.

Syrupus Acaciæ (25 per cent. mucilage), . . . . . A vehicle.

## ACTION.

**Demulcent.**

## USE.

Acacia is used pharmaceutically in making pills, emulsions, etc. It is also used as a pleasant vehicle in the administration of certain insoluble powders.

It may be used for its demulcent properties in the treatment of diseases of the mouth, and pharynx.

## TRAGACANTHA.

**Tragacanth.**

A gummy exudation obtained by making incisions in the stems of the *Astragalus gummifer*, and from other species of *Astragalus* (Nat. ord., *Leguminosæ*).

**Chief constituents.** Tragacanthin (or bassorin), arabin, starch, etc.

It occurs in curved and contorted bands, of tough and horn-like consistency. Color white, or faintly yellow. On melting tragacanth with water it swells and gradually forms a gelatinous mass.

## PREPARATION.

Mucilago Tragacanthæ (6 per cent.) . . . . . A vehicle.



**ACTION.**

Demulcent.

**USE.**

Tragacanth is used pharmaceutically to aid in the suspension of insoluble powders, etc., in mixtures and emulsions.

**CATECHU.**

An extract prepared from the wood of the *Acacia Catechu* (Nat. ord., *Leguminosæ*).

Habitat. East Indies.

Chief constituent. Catechu-tannic acid.

It occurs in irregular, dark-brown, brittle masses. It is nearly odorless, and has an astringent, sweetish taste. Soluble in alcohol, and in water.

**PREPARATIONS.**

Trochisci Catechu, . . . . . 1 = 0.06 Gm. gr. i.

Tinctura Catechu Composita (10 per cent.), 1.90-3.75 Cc. 3½-i.

**ACTION.**

In action catechu resembles tannic acid, *q. v.*

**USE.**

Catechu may be used in diseases of the alimentary canal, where astringents are indicated.

**KINO.**

The inspissated juice of the *Pterocarpus Marsupium* (Nat. ord., *Leguminosæ*).

Habitat. East Indies.

Chief constituents. Kino-tannic acid, pyrocatechin.

This occurs in small, brownish-red, brittle pieces. It is nearly odorless, and has an astringent, sweetish taste. Sparingly soluble in water; soluble in alcohol.

**PREPARATION.**

Tinctura Kino (10 per cent.), . . . . . 3.75-7.50 Cc. 3i-ij.

**ACTION.**

Kino has an astringent action, quite similar to that of catechu.

**USE.**

Kino may be used as an astringent, where astringents are required, in diseases of the alimentary canal.

## COPAIBA.

The oleoresin of *Copaifera Langsdorffii*, and other species of *Copaifera* (Nat. ord., *Leguminosæ*).

Habitat. Brazil.

Chief constituents. Resins, and volatile oils.

This is a transparent, viscid liquid, of a pale yellow color, having a peculiar, aromatic odor, and a bitter, acrid taste. Sp. gr.: 0.940–0.990, at 15° C. Insoluble in water; soluble in alcohol.

## PREPARATIONS.

Copaiba, . . . . .	0.30–0.95 Cc.	℥ v–xv.
Oleum Copaibæ . . . . .	0.30–0.60 Cc.	℥ v–x.
Resina Copaibæ, . . . . .	0.60–0.95 Gm.	gr. x–xv.
Massa Copaibæ, . . . . .	0.60–0.95 Gm.	gr. x–xv.

## ACTION.

Stimulant and antiseptic. In the stomach it may cause nausea. During elimination through the bronchial mucous membrane, it acts as a stimulating, and antiseptic expectorant. During elimination by the kidneys its stimulant and antiseptic action is exercised throughout the urinary tract. During elimination by the skin it may cause sufficient irritation to produce a rash.

## USE.

Copaiba in its various forms is used for its stimulating and antiseptic action along the lines of elimination: thus, in sub-acute bronchitis; in the advanced stages of gonorrhœa, etc.

## BALSAMUM PERUVIANUM.

## Balsam of Peru.

A balsam obtained from *Toluiifera Pereiræ* (Nat. ord., *Leguminosæ*).

Habitat. Central America. (Balsam of Peru is a misnomer.)

Chief constituents. A resin, volatile oil, cinnamic acid, and benzoic acid.

This is a liquid, having a syrupy consistence, with a brownish-black color; of an agreeable, vanilla-like odor, and a bitter taste. Sp. gr.: 1.135 to 1.150 at 15° C. Miscible with alcohol.

Dose, 0.30–0.95 Gm. gr. v–xv.

## ACTION.

Antiseptic, and stimulant. These properties are apparent when the drug is used locally, and also along the lines of elimination when given internally; hence a stimulating, and antiseptic expectorant; also a stimulant and disinfectant throughout the urinary tract.

## USE.

Locally, balsam of Peru may be used in the treatment of chronic skin diseases; upon chronic, ulcerated surfaces; to destroy the *acarus scabiei*, etc.

Internally, it may be used for its stimulating, and antiseptic, action in certain diseases of the respiratory organs, and of the urinary tract.

## BALSAMUM TOLUTANUM.

## Balsam of Tolu.

A balsam obtained from *Toluiifera Balsamum* (Nat. ord., *Leguminosæ*).

Habitat. Venezuela, and Colombia.

Chief constituents. A resin, volatile oil, cinnamic acid, and benzoic acid.

This occurs as a yellowish-brown, semi-fluid, or nearly solid, mass. It has an agreeable odor, recalling that of vanilla, and a mild, aromatic taste. Nearly insoluble in water; soluble in alcohol.

## PREPARATIONS.

Balsamum Tolutanum . . . . . 0.30-0.95 Gm. gr. v-xv.

Syrupus Tolutanus (1 per cent.) . . . 3.75-7.50 Cc. ʒj-ij

Tinctura Tolutana (10 per cent.) . . . 1.90-3.75 Cc. ʒ½-j.

Tinctura Benzoini Composita . . . . 0.95-1.90 Cc. ℥xv-xxx.

## ACTION.

This has an antiseptic and stimulant action like balsam peru, with a pleasanter flavor. It is used internally more than is balsam peru.,

## USE.

Having a pleasant flavor, tolu balsam is often used as an antiseptic and stimulating expectorant in cough mixtures in the treatment of bronchitis, etc.

## PRUNUS VIRGINIANA.

## Wild Cherry.

The bark of the *Prunus serotina* (Nat. ord., *Rosaceæ*), collected in autumn. It has the odor of bitter almonds, with an astringent, aromatic, bitter taste.

Habitat. North America.

Chief constituents. Tannic acid: an amorphous, bitter principle, and a ferment which is analogous to, if not identical with, emulsin. The reaction of these two latter constituents in water forms hydrocyanic acid and oil of bitter almonds.

## PREPARATIONS.

Extractum Pruni Virginianæ Fluidum . 1.90- 3.75 Cc. ʒ½-j.  
 Infusum Pruni Virginianæ (4 per cent.) 15.00-60.00 Cc. ʒ½-ij.  
 Syrupus Pruni Virginianæ (15 per cent.) 3.75-15.00 Cc. ʒi-iv.

## ACTION.

That of a bitter tonic, and of a sedative. The sedative action is like that of hydrocyanic acid. See p. 38.

## USE.

The wild cherry bark preparations make pleasant vehicles and are often used as the basis for cough mixtures.

## PRUNUM.

**Prune.**

The fruit of the *Prunus domestica* (Nat. ord., *Rosaceæ*). The pulp has a sweet, acidulous taste.

Habitat. Western Asia.

Chief constituents. Malic acid, and sugar.

## PREPARATION.

Confectio Sennæ (7 per cent.) . . . . . See Senna.

## ACTION.

Laxative.

## USE.

The stewed fruit may be used to control a tendency to chronic constipation.

## AMYGDALA DULCIS.

**Sweet Almond.**

The seeds of the *Prunus Amygdalus*, var. *dulcis* (Nat. ord., *Rosaceæ*). These have a bland, sweetish taste, free from rancidity, and when triturated with water, yield a milk-white emulsion, free from the odor of hydrocyanic acid.

Habitat. Asia. Southern Europe.

Chief constituents. A fixed oil, nitrogenous compounds, mucilage, sugar, and emulsin.

## PREPARATIONS.

Emulsum Amygdalæ (6 per cent.) . . . 3.75-30.00 Cc. ʒi-ʒi.  
 Syrupus Amygdalæ (14 per cent.) . . . 3.75-30.00 Cc. ʒi-ʒi.

## ACTION.

Nutrient, and demulcent.

## USE

Being free from starch, the almond flour may be used as an article of diet in diabetes mellitus. The emulsion, or the syrup, may be used for their demulcent properties, in cough mixtures, etc.

## AMYGDALA AMARA.

**Bitter Almond.**

The seeds of the *Prunus Amygdalus*, var. *amara* (Nat. ord., *Rosaceæ*). These have a bitter taste, and when triturated with water, yield a milk-white emulsion, which emits the odor of hydrocyanic acid.

Habitat. Western Asia.

Chief constituents. The same as of sweet almond, plus amygdalin.

**Amygdalin**,  $C_{20}H_{27}NO_{11}$ , is white, crystalline, odorless, having a peculiar, bitter taste. Soluble in water, and in hot alcohol. It is split up by the ferment emulsin into glucose and hydrocyanic acid.

## PREPARATION.

Syrupus Amygdalæ (4 per cent.) . . . See Amygdalæ Dulcis.

## ACTION.

That of hydrocyanic acid, viz.: sedative, and toxic.

## OLEUM AMYGDALÆ AMARÆ.

**Oil of Bitter Almonds.**

A volatile oil obtained from bitter almonds by maceration with water and subsequent distillation. It should be kept in well-stoppered bottles protected from light.

It is a clear, colorless, or yellowish, thin and strongly refractive liquid, having a peculiar aromatic odor, like that of hydrocyanic acid, and a bitter, and burning taste. Sp. gr.: 1.060 to 1.070 at 15° C. Soluble in 300 parts of water; soluble in alcohol, and in ether.

## PREPARATIONS.

Oleum Amygdalæ Amaræ . . . . . 0.01–0.03 Cc. ℥  $\frac{1}{8}$ – $\frac{1}{2}$ .

Aqua Amygdalæ Amaræ ( $\frac{1}{10}$  per cent.) . 3.75–7.50 Cc. ʒi–ij.

Spiritus Amygdalæ Amaræ (1 per cent.) 0.30–0.95 Cc. ℥ v–xv.

## ACTION.

This has the sedative action of hydrocyanic acid. See p. 38.

## USE.

These preparations are used for their sedative action, after the manner of hydrocyanic acid, in cough mixtures, etc.



## TOXICOLOGY.

That of hydrocyanic acid. See p. 38.

## OLEUM AMYGDALÆ EXPRESSUM.

**Expressed Oil of Almond.**

A fixed oil expressed from bitter or sweet almonds. It should be kept in well-stoppered bottles in a cool place.

It is a clear, pale, straw-colored, or colorless, oily liquid; almost inodorous, and having a mild, nutty taste. Sp. gr.: 0.915–0.920, at 15° C. Slightly soluble in alcohol.

Chief constituents. Olein and palmitin.

Dose, 3.75–7.50 Cc. ʒi–ij.

## ACTION.

Locally, that of a bland protectant, or emollient.

## USE.

Locally, in skin diseases, etc.

## QUILLAJA.

**Soap Bark.**

The inner bark of the *Quillaja Saponaria* (Nat. ord., *Rosaceæ*). This is odorless; the taste is acrid.

Habitat. Peru, and Chili.

Chief constituent. Saponin (found also in Senega).

## PREPARATION.

Tinctura Quillajæ (20 per cent.) . . . 0.30–0.95 Cc. ℥ v–xv.

## ACTION.

Locally and along the lines of elimination it has an irritant action. It is toxic (paralyzant) in large doses.

## USE.

It may be used as a stimulating expectorant, as a substitute for senega. It is an unimportant therapeutic agent.

## ROSA GALLICA.

**Red Rose.**

The petals of *Rosa Gallica* (Nat. ord., *Rosaceæ*), collected before expanding. Odor fragrant; taste bitter, and astringent.

Habitat. Asia, and Europe.

Chief constituents. A volatile oil, and tannic acid.

## PREPARATIONS.

In some pills, honeys, and syrups.

Confectio Rosæ (8 per cent.) . . . . . Ad libitum.

Extractum Rosæ Fluidum . . . . . 1.90-3.75 Cc.  $\frac{3}{4}$ -i.

Mel Rosæ (12 per cent.) . . . . . 1.90-3.75 Gm.  $\frac{3}{4}$ -i.

Syrupus Rosæ (12½ per cent. fl. ext.) . . Ad libitum.

## ACTION.

Mildly astringent.

## USE.

Pharmaceutically, the rose preparations may be used as pleasant vehicles.

## ROSA CENTIFOLIA.

**Pale Rose.** Cabbage Rose.

The petals of *Rosa centifolia* (Nat. ord., *Rosaceæ*). These have a fragrant odor, and a bitter, slightly astringent taste.

Habitat. Asia.

Chief constituents. A volatile oil, and tannic acid.

## PREPARATION.

Syrupus Sarsaparillæ Compositus . . . . . See Sarsaparilla.

## ACTION.

Mildly astringent.

## USE.

This is an unimportant therapeutic agent.

## OLEUM ROSÆ.

**Oil of Rose.** Attar, otto, or essence of rose.

This is a volatile oil distilled from the fresh leaves of *Rosæ damascena* (Nat. ord., *Rosaceæ*). It should be kept in well-stoppered vials, protected from light.

It is a pale-yellowish, transparent liquid, having the strong, fragrant odor of rose, and a mild, slightly sweetish taste. Sp. gr.: 0.865 to 0.880 at 20° C. At a lower temperature (16° C.) it solidifies. It is but slightly soluble in alcohol.

## PREPARATIONS.

Aqua Rosæ Fortior . . . . .	} For pharmaceutical use.
Aqua Rosæ . . . . .	
Unguentum Aqua Rosæ . . . . .	

## ACTION.

That of a stimulant and carminative.

## USE.

These preparations are used as perfumes. They have no therapeutic use.

## RUBUS.

**Blackberry.**

The bark of the *Rubus villosus*, *Rubus canadensis*, and *Rubus trivialis* (Nat. ord., *Rosaceæ*). This is odorless; the taste is astringent, and somewhat bitter.

Habitat. North America.

Chief constituent. Tannic acid.

## PREPARATIONS.

Extractum Rubi Fluidum . . . . . 1.90-3.75 Cc.  $\frac{3}{2}$ -i.

Syrupus Rubi (fl. ext. 25 per cent.) . . . 3.75-7.50 Cc.  $\frac{3}{2}$ -ij.

## ACTION.

Astringent.

## USE.

The preparations of blackberry make pleasant, and at the same time astringent, vehicles, for drugs used in the treatment of diarrhœa.

## RUBUS IDÆUS.

**Raspberry.**

The fruit of the *Rubus idæus* (Nat. ord., *Rosaceæ*). This has an agreeable odor, and a pleasant, acidulous taste.

Habitat. Europe. America, etc.

Chief constituents. Citric, tartaric, and malic acids.

## PREPARATION.

Syrupus Rubi Idæi . . . . . 1.90-3.75 Cc.  $\frac{3}{2}$ -i.

## ACTION.

Laxative.

## USE.

The syrup is generally used as a vehicle, or flavoring agent.

## CUSSO.

**Kousso.**

The female inflorescence of *Hagenia abyssinica* (Nat. ord., *Rosaceæ*). The odor is slight, fragrant, and tea-like; the taste bitter, acrid, and nauseous.

Habitat. Abyssinia.

Chief constituents. Tannic acid, a volatile oil, and kossin, or koussin.

## PREPARATIONS.

Extractum Cusso Fluidum . . . . 7.50-15.00 Cc. ʒij-iv.  
 ϕ Kosin, Kouissin, or Koussein . . . 0.95- 1.90 Gm., gr. xv-xxx.

## ACTION.

An anthelmintic against the various forms of tape-worm. It is not at all certain in action; is very unpleasant to the taste, and apt to cause nausea, vomiting and diarrhoea.

## USE.

Cusso, or Kosin, is used to cause the expulsion of the tape-worm.

## HAMAMELIS.

## Witch-hazel.

The leaves of *Hamamelis virginiana* (Nat. ord., *Hamamelaceæ*), collected in the autumn. These are inodorous; taste astringent, and bitter.

Habitat. North America.

Chief constituent. Tannic acid

## PREPARATION.

Extractum Hamamelidis Fluidum . . . . 1.90-3.75 Cc. ʒ½-j.

## ACTION.

Astringent.

## USE.

This drug has an extensive use in domestic practice, in the treatment of sprains, bruises, etc. It is practically a *placebo*.

## STRYAX.

## Storax.

A balsam prepared from the inner bark of the *Liquidambar orientalis* (Nat. ord., *Hamamelaceæ*). This occurs as a semi-liquid, gray, sticky, opaque mass; transparent in thin layers. It has an agreeable odor, and a balsamic taste.

Habitat. Asia Minor.

Chief constituents. Styrol, cinnamic acid, stryacin, and resin.

Dose: 0.30-0.95 Gm., gr. v-xv.

## ACTION.

That of a stimulating expectorant.

## USE.

Therapeutically its use is limited to that of the preparation, *Tinctura benzoini composita*, *q. v.*

## EUCALYPTUS.

## Blue-gum tree.

The leaves of *Eucalyptus globulus* (Nat. ord., *Myrtaceæ*), collected from the older parts of the trees. The odor is strongly camphoraceous; the taste pungent, aromatic, and somewhat cooling, bitter, and astringent.

Habitat. Australia.

Chief constituents. A volatile oil, tannic acid, resin.

## PREPARATION.

Extractum Eucalypti Fluidum . . . . 0.30–0.60 Cc. M v–x.

## ACTION.

Eucalyptus has the action of an antipyretic, an antiperiodic and an astringent. Its action is dependent chiefly upon the volatile oil, or its chief constituent, eucalyptol, *q. v.*

## USE.

It may be used as a poor substitute for the cinchona preparations in the treatment of malarial diseases.

## OLEUM EUCALYPTI.

## Oil of Eucalyptus.

A volatile oil distilled from the fresh leaves of the *Eucalyptus globulus* and other species of *Eucalyptus*.

It should be kept in well-stoppered bottles, in a cool place, protected from the light.

It is a colorless, or faintly-yellowish liquid, having a characteristic, aromatic, somewhat camphoraceous odor, and a pungent, spicy, and cooling taste. Sp. gr. : 0.915–0.925 at 15° C. Soluble in alcohol.

Chief constituent. Eucalyptol.

Dose : 0.30–0.60 Cc. M v–x.

## ACTION AND USE.

That of eucalyptol, *q. v.*

EUCALYPTOL.  $C_{10}H_{18}O$ .

This is a neutral body obtained from the volatile oil of *Eucalyptus globulus*, and of some other species of *Eucalyptus*. It should be kept in well-stoppered bottles, in a cool place, protected from light.

It occurs as a colorless liquid, having a characteristic, aromatic, and distinctively camphoraceous odor, and a pungent, spicy, and cooling taste. Sp. gr. : 0.930 at 15° C. It is soluble in alcohol.



## ACTION.

Eucalyptol is antiseptic, antiperiodic, antipyretic, stimulant, and irritant. The irritant action is present when the drug is applied locally, causing redness of the skin, and, if evaporation is prevented, vesication. When swallowed, it causes a burning sensation, nausea, and some looseness of the bowels. After absorption small doses have a stimulating action upon the nervous system, increasing nervous excitability; large doses act as a depressant. Death may come from paralysis of respiration.

It resembles quinine in action as an antiperiodic, but is not nearly so effective.

Elimination takes place through the lungs, kidneys, and skin, and may cause more or less irritation throughout these parts. During elimination by the kidneys, it imparts a characteristic odor to the urine. The antiseptic action may be obtained by local use, and also, along the lines of elimination, by internal administration.

## USE.

Eucalyptol (or the oil of eucalyptus) may be used as a local antiseptic. It may also be used by inhalation, alone, or in combination with other antiseptics, in the treatment of certain diseases of the respiratory tract,—chronic bronchitis, pulmonary tuberculosis, etc.

Internally, the eucalyptol has advantages over the oil, for it is less irritating. It is used for its antiseptic action along the lines of elimination.

## Φ EUCALYPTUS AMYGDALINA.

**Australian, or Botany Bay Kino.** Red-gum.

This is a resinous product obtained from the *Eucalyptus Amygdalina* and other species of *Eucalyptus* (Nat. ord., *Myrtaceæ*). It is colored red, and has an astringent taste.

Habitat. Australia.

Chief constituent. Tannic acid.

Dose: 0.30–0.60 Gm. gr. v–x.

## ACTION.

Astringent.

## USE.

It may be used as a lozenge, in diseases of the mouth, and pharynx, requiring astringent applications.

## OLEUM MYRCIÆ.

**Oil of Myrcia.** Oil of Bay.

A volatile oil distilled from the leaves of the *Myrcia acris* (Nat. ord., *Myrtaceæ*). It should be kept in well-stoppered bottles in a cool place.

It is a yellowish or brownish-yellow liquid, having an aromatic, somewhat clove-like odor, and a pungent, spicy taste. Sp. gr.: 0.975 to 0.990 at 15° C. Soluble in alcohol.

## PREPARATION.

Spiritus Myrciæ (8 per cent.) . . . . . For external use.

## ACTION.

Stimulating.

## USE.

It has no therapeutic use.

## ♠ CHEKAN.

**Cheken.**

The leaves of a Chilian evergreen shrub, the *Eugenia chekan* (Nat. ord. *Myrtaceæ*).

Habitat. Chili.

Chief constituents. A volatile oil, and tannic acid.

## PREPARATION.

Extractum Chekan Fluidum, . . . . . 1.90-3.75 Cc. ʒ ½-j.

## ACTION.

Chekan has the action of a stimulant, and antiseptic, along the lines of elimination. This action is most marked throughout the respiratory, and the urinary tract,—a stimulating expectorant, and a stimulating diuretic.

## USE.

As yet chekan has no established place as a therapeutic agent. It has been used as a stimulating expectorant in the treatment of chronic bronchitis, etc.

## CARYOPHYLLUS.

**Cloves.**

The unexpanded flowers of the *Eugenia aromatica* (Nat. ord., *Myrtaceæ*). These have a strong, aromatic odor and a pungent, spicy taste.

Habitat. East Indies.

Chief constituents. A volatile oil, tannic acid, and gum.

## PREPARATION.

Tincture Lavandulæ Composita . . . 0.95-3.75 Cc. ℥ xv-ʒ i.

## ACTION.

Stimulating, carminative, antiseptic, and analgesic.

## USE.

Pharmaceutically, as a flavoring agent. It may be used to relieve flatulence, but it is an unimportant therapeutic agent.

## OLEUM CARYOPHYLLI.

## Oil of Cloves.

A volatile oil distilled from cloves. It should be kept in well-stoppered bottles, in a cool place, protected from the light.

It is a pale yellow, thin liquid, becoming darker and thicker by age and exposure to the air, having a strongly aromatic odor, and a pungent and spicy taste. Sp. gr.: 1.060 to 1.067 at 15°C. Soluble in an equal volume of alcohol.

Dose: 0.12–0.30 Cc.  $\mathfrak{m}$ ij–v.

## ACTION AND USE.

That of cloves, *q. v.* The oil may be used for its antiseptic and analgesic properties,—as in toothache, etc.

## PIMENTA.

## Allspice.

The nearly ripe fruit of the *Pimenta officinalis* (Nat. ord., *Myrtaceæ*). It has a pungently aromatic, clove-like, odor, and taste.

Habitat. West Indies.

Chief constituents. A volatile oil, tannic acid, and gum.

## ACTION AND USE.

The same as that of cloves, *q. v.*

## OLEUM PIMENTÆ.

## Oil of Allspice.

A volatile oil distilled from Pimenta. It should be kept in well-stoppered bottles, in a cool place, protected from light.

It is a colorless, or pale-yellow liquid, having a strong, aromatic, clove-like odor, and a pungent, spicy taste. It becomes darker, and thicker, by age and exposure to the air. Sp. gr.: 1.045 to 1.055, at 15°C. Soluble in alcohol.

Dose: 0.12–0.30 Cc.  $\mathfrak{m}$ ij–v.

## ACTION AND USE.

The same as that of oil of cloves, *q. v.*

## Φ JAMBUL.

## Jamboo. Jambol. Java Plum.

The powdered seeds or bark of the *Eugenia jambolana* (Nat. ord., *Myrtaceæ*).

Habitat. East Indies.

## PREPARATIONS.

Pulvis Jambul . . . . .	0.30-0.60 Cc. gr. v-x.
Extractum Jambul Fluidum . . . . .	0.30-0.60 Cc. ℥ <sub>v</sub> -x.

## ACTION.

It has an anti-fermentative effect on plant diastase and on other sugar-forming ferments.

## USE.

It may prove useful in the treatment of diabetes mellitus.

## OLEUM CAJUPUTI.

## Oil of Cajuput.

A volatile oil distilled from the leaves of the *Melaleuca Leucadendron* (Nat. ord., *Myrtaceæ*). It should be kept in well-stoppered bottles, in a cool place.

It is a light, thin, bluish-green, or after rectification, colorless liquid, having a peculiar, agreeable, distinctly camphoraceous odor, and an aromatic, bitterish taste. Sp. gr.: 0.922 to 0.929 at 15° C. Soluble in alcohol.

Dose: 0.12-0.30 Cc. ℥ ij-v.

## ACTION.

This oil has the action of a local stimulant, carminative, diaphoretic, antiseptic and analgesic.

## USE.

It may be used to relieve the flatulence of colic; to give temporary relief from pain,—as in toothache.

## GRANATUM.

## Pomegranate.

The bark of the stem, and root, of *Punica Granatum* (Nat. ord., *Lythraricæ*). It is inodorous, with an astringent, very slightly bitter, taste.

Habitat. Tropical countries.

Chief constituents. Pelletierine, tannic acid, mannite, etc.

Pelletierine,  $C_2H_{13}NO$ , is a liquid; miscible with water, alcohol, and ether.

## PREPARATIONS.

Φ Decoctum Granati (3i in Oi) . . .	15.00-30.00 Cc.	3½-i.
Φ Extractum Granati Fluidum . . .	1.90- 3.75 Cc.	3½-i.
Φ Pelletierine Tannate . . . . .	0.30- 1.25 Gm.	gr. v-xx.

## ACTION.

Astringent, anthelmintic.

## USE.

The preparations of pomegranate are used to cause the expulsion of tapeworm.

Φ **PAPAYOTIN.**

The dried juice from the unripe fruit of the *Carica papaya* (Nat. ord., *Passifloræ*). The true papaw, or melon-tree.

Habitat. South America.

Chief constituent. Papain,—a ferment.

Dose : 0.06–0.30 Gm. gr. i–v.

## ACTION.

That of a digestant on albumin, and fibrin ; acting in an acid, neutral, or slightly alkaline solution.

## USE.

It may be used locally in certain chronic skin diseases. In diphtheria, to dissolve the false membrane (a 5 to 10 per cent. solution). Internally, as a digestant in some forms of dyspepsia.

**BRYONIA.**

**Bryony.** White Hops.

The root of the *Bryonia alba*, and of *Bryonia dioica* (Nat. ord., *Cucurbitaceæ*). It is inodorous, and has a disagreeably bitter taste.

Habitat. Central and Southern Europe.

Chief constituent. **Bryonin**,  $C_{48}H_{80}O_{19}$ , which is a colorless, and amorphous substance ; very bitter ; soluble in water.

## PREPARATION.

Tinctura Bryoniæ (10 per cent.) . . . 0.30–1.90 Cc. ℞-xxx.

## ACTION.

Bryonia has an irritant action. Internally, if used in large doses, it acts as a cathartic, increasing secretion and peristalsis, but because of its disadvantages,—the production of severe griping, and possible inflammation of the intestinal canal—it is never used for this purpose. It is supposed to have a selective action on both serous and mucous surfaces, especially the pleura, and the bronchial mucous membrane. If this is true it is probably during elimination that these surfaces are reached, and a certain degree of stimulation produced.

## USE.

Bryonia may be used in atonic dyspepsia ; in chronic constipation, due to deficient intestinal secretion ; in pleurisy, to prevent effusion, or to favor absorption, if effusion has taken place.



## COLOCYNTHIS.

**Bitter Cucumber.**

The fruit of the *Citrullus Colocynthis* (Nat. ord., *Cucurbitaceæ*), deprived of its rind. This is inodorous; the taste is intensely bitter.

Habitat. Turkey, and other tropical countries.

Chief constituent. Colocynthin,  $C_{56}H_{84}O_{23}$ , which is a yellowish substance, with a neutral reaction, and an intensely bitter taste. Sparingly soluble in water; soluble in alcohol.

## ACTION.

Colocynth is a powerful drastic cathartic, whether given internally or hypodermatically. It acts as an irritant, increasing both secretion and peristalsis, and causing considerable griping. It also increases the secretion of bile. Large doses cause pain, bloody stool, and inflammation of the intestinal mucous membrane; also irritation throughout the urinary tract. It is seldom prescribed alone, because of its unpleasant action.

## PREPARATIONS.

Extractum Colocynthidis . . . . . 0.12–0.30 Gm. gr. ij–v.

Extractum Colocynthidis Compositus . 0.12–0.30 Gm. gr. ij–v.

Pilulæ Catharticæ Compositæ.

Pilulæ Catharticæ Vegetabiles.

**Compound Extract of Colocynth** contains colocynth, 16 parts; aloes, 50 parts; scammony resin, 14 parts; cardamom, 6 parts; soap, 14 parts; alcohol, 10 parts.

**Compound Cathartic Pill** contains 0.08 Gm. (gr.  $1\frac{1}{2}$ ) compound extract of colocynth, 0.06 Gm. (gr. 1) calomel, 0.03 Gm. (gr.  $\frac{1}{2}$ ) extract of jalap, and 0.015 Gm. (gr.  $\frac{1}{4}$ ) gamboge.

**Vegetable Cathartic Pill** contains 0.06 Gm. (gr. 1) compound extract of colocynth, 0.03 Gm. (gr.  $\frac{1}{2}$ ) each of extract of hyoscyamus, and extract jalap, 0.015 Gm. (gr.  $\frac{1}{4}$ ) each of extract of leptandra, resin of podophyllum, and oil of peppermint.

## USE.

The preparations of colocynth may be used, generally in combination with other purgatives, when prompt catharsis is required, as in the treatment of dropsical conditions. It is too harsh for use alone.

## PEPO.

**Pumpkin.**

The seeds of the *Cucurbita Pepo* (Nat. ord., *Cucurbitaceæ*). These are inodorous, and have a bland, oily taste.

Habitat. Tropical Asia and America.

Chief constituents. A fixed oil, and an acrid resin.

Dose : 30.00 to 60.00 Gm. ʒi-ij (in emulsion, or in decoction).

#### ACTION.

Anthelmintic.

#### USE.

Pepo may be used to cause the expulsion of tape-worms from the intestinal canal.

#### ELATERINUM. $C_{20}H_{28}O_5$ .

A neutral principle, extracted from Elaterium, a substance deposited by the juice of the fruit of *Ecballium Elaterium* (Nat. ord., *Cucurbitaceæ*), squirting cucumber.

#### PREPARATIONS.

Elaterinum . . . . . 0.003-0.006 Gm. gr.  $\frac{1}{20}$ - $\frac{1}{10}$ .

Trituratio Elaterini (10 per cent.) . 0.03-0.06 Gm. gr.  $\frac{1}{2}$ -i.

#### ACTION.

One of the most active of the drastic, hydragogue cathartics. It only acts as a cathartic when taken internally. It increases peristalsis, and secretion, to a marked degree. Its irritant action is pronounced, and may even cause death.

#### USE.

When active cathartic is wanted, as in cerebral congestion, certain dropsical conditions, etc.

#### ANISUM.

##### Anise.

The fruit of the *Pimpinella Anisum* (Nat. ord., *Umbelliferæ*). It has an agreeable aromatic odor, and a sweet, spicy taste.

Habitat. The Levant, and Egypt.

Chief constituent. A volatile oil.

Dose : 0.30-0.60 Gm. gr v-x.

#### ACTION.

Stimulant and carminative. It is dependent upon its volatile oil for its action.

#### USE.

Pharmaceutically, anise is used as a flavoring ingredient.

#### OLEUM ANISI.

##### Oil of Anise.

A volatile oil distilled from anise. It should be kept in well-stopped bottles protected from the light.

It is a colorless, or pale-yellow, thin, and strongly refractive liquid, having the characteristic odor of anise, and a sweetish, mildly aromatic taste. Sp. gr. : 0.980 to 0.990 at 17° C. Soluble in alcohol.

#### PREPARATIONS.

Oleum Anisi . . . . . 0.12-0.30 Cc. ℥ ij-v.  
 Aqua Anisi ( $\frac{2}{10}$  per cent.) . . . . . For pharmaceutical use.  
 Spiritus Anisi (10 per cent.) . . . . . 0.95-1.90 Cc. ℥ xv-xxx.

#### ACTION.

That of a stimulant, and carminative.

#### USE.

Oil of Anise, and its preparations, are used chiefly as flavoring agents. It may be used in colic, etc., for its carminative action.

#### FÆNICULUM.

##### Fennel.

The fruit of the *Feniculum Capillaceum* (Nat. ord., *Umbelliferae*). Its odor and taste is anise like.

Habitat. Germany.

Chief constituent. A volatile oil.

Dose : 0.30-0.60 Gm. gr. v-x.

#### ACTION.

Stimulant and carminative. Its action is due to its volatile oil.

#### USE.

In combination with some laxatives fennel may be used to prevent griping.

#### OLEUM FÆNICULI.

##### Oil of Fennel.

A volatile oil distilled from fennel. It should be kept in well-stoppered bottles in a cool place.

It is a colorless, or pale-yellowish liquid, having the characteristic, aromatic odor of fennel, and a sweetish, mild and spicy taste. Sp. gr. : not less than 0.960 at 15° C. Soluble in alcohol.

#### PREPARATIONS.

Oleum Fœniculi . . . . . 0.12-0.30 ℥ ij-v.  
 Aqua Fœniculi ( $\frac{2}{10}$  per cent.) . . . . . For pharmaceutical use.  
 Pulvis Glycyrrhizæ Compositus ( $\frac{4}{10}$  per cent.) . See Glycyrrhiza.

#### ACTION.

Stimulant and carminative.

## USE.

Oil of fennel may be used in combination with some laxatives to prevent griping.

## CONIUM.

**Hemlock.** Spotted hemlock.

The full-grown fruit of the *Conium maculatum* (Nat. ord., *Umbelliferæ*), gathered while yet green. The odor and taste is slight. When triturated it gives off a strong, disagreeable, mouse-like odor.

Habitat. Europe.

Chief constituent. Coniine, and a volatile oil.

**Coniine**,  $C_8H_{17}N$ , is a yellow, oily liquid, with a very acrid taste, and a strong, penetrating odor; volatile; soluble in alcohol, ether, the fixed, and volatile oils, and sparingly soluble in water.

## PREPARATIONS.

Extractum Conii . . . . .	0.03 — 0.06	Gm., gr. $\frac{1}{2}$ —i.
Extractum Conii Fluidum . . . . .	0.06 — 0.30	Cc. ℥i—v.
Φ Coniinæ Hydrobromas . . . . .	0.002—0.004	Gm., gr. $\frac{1}{30}$ — $\frac{1}{15}$ .

## ACTION.

Conium has the action of a motor paralyzer, and a poison. It first paralyzes the peripheral motor nerves, gradually extending upward to the nerve trunks, and finally to the motor centres. Death may occur from paralysis of respiration, due to the action of the drug on nerve trunks supplying the respiratory muscles. Its action is accompanied by a feeling of weakness (first in the lower extremities), and of general relaxation.

## USE.

The preparations of Conium may be used in painful conditions, or spasms, due to disease of nerve trunks. There are no reliable preparations, and the drug is but little used.

## CARUM.

**Caraway.**

The fruit of the *Carum carvi* (Nat. ord., *Umbelliferæ*). This has an agreeable odor, and a sweetish, spicy taste.

Habitat. Asia.

Chief constituent. A volatile oil, tannic acid, and a resin.

## ACTION AND USE.

That of its volatile oil, *q. v.*

## OLEUM CARI.

**Oil of Caraway.**

A volatile oil distilled from caraway. It should be kept in well-stoppered bottles in a cool place, protected from light.

It is a colorless, or pale-yellow, thin liquid, having the characteristic, aromatic odor of caraway, and a mild, spicy taste. Sp. gr., 0.910 to 0.920 at 15° C. Soluble in alcohol.

Dose: 0.12-0.30 Cc. ℥ij-v.

#### ACTION.

Stimulant and carminative.

#### USE.

Pharmaceutically, this oil is used as a flavoring agent. It may be used internally for its carminative action.

### CORIANDRUM.

The fruit of *Coriandrum sativum* (Nat. ord., *Umbelliferae*). The odor and taste are agreeably aromatic.

Habitat. Italy.

Chief constituent. A volatile oil.

#### ACTION AND USE.

That of its volatile oil, *q. v.*

### OLEUM CORIANDRI.

#### Oil of Coriander.

A volatile oil distilled from coriander. It should be kept in well-stoppered bottles in a cool place.

A colorless or slightly yellowish liquid, having the characteristic, aromatic odor of coriander, and a warm, spicy taste. Sp. gr., 0.870 to 0.885 at 15° C. Soluble in alcohol.

Dose: 0.12-0.30 Cc. ℥ij-v.

#### ACTION.

Stimulant, and carminative.

#### USE.

Pharmaceutically, this oil is used as a flavoring agent. Therapeutically, it may be used, in combination with laxatives, to prevent griping.

### Φ APIUM.

#### Celery Fruit.

The fruit of the *Apium graveolens* (Nat. ord., *Umbelliferae*).

Habitat. Southern Europe. (The common celery of our gardens.)

Chief constituents. A volatile oil, and apiol. (Apiol is found also in petroselinum, *q. v.*)

Dose (fluid extract): 0.30-0.95 Cc. ℥v-xv.

#### ACTION.

Carminative, stimulant, emmenagogue, and diuretic.



## USE.

Pharmaceutically, it is used for flavoring.

## Φ PETROSELINUM.

**Parsley.**

The root of the *Petroselinum sativum* (Nat. ord., *Umbelliferæ*).

It has an aromatic odor, and a sweetish, slightly aromatic taste.

Habitat. Southern Europe.

Chief constituents. A volatile oil, and apiol.

Dose: 1.90–3.75 Gm.  $3\frac{1}{2}$ –i (powdered).

## ACTION.

Stimulant, carminative, emmenagogue, and diuretic.

## USE.

It may be used as a non-irritating diuretic. It may be used in amenorrhœa, or in dysmenorrhœa. Its therapeutic use has been quite largely displaced by its active principle, apiol, *q. v.*

Φ APIOL.  $C_{12}H_{14}O_4$ .

This is a stearoptene obtained from the *Petroselinum sativum*, and from the *Apium graveolens*.

It occurs in white needles, of a feeble parsley odor, and a peculiar, biting, acrid flavor. Sp. gr.: 1.015 at 15° C. Insoluble in water; soluble in alcohol.

Dose: 0.60–0.95 Gm. gr. x–xv.

## ACTION.

Emmenagogue, diuretic, and antiperiodic.

## USE.

Apiol has been used in the treatment of malarial diseases; it is inferior to the salts of quinine. As a diuretic, it is useful in inflammatory conditions of the genito-urinary tract,—cystitis, etc. Its chief therapeutic usefulness is in functional dysmenorrhœa, and in functional amenorrhœa.

**ASAFÆTIDA.**

A gum resin obtained from the root of *Ferula fætida* (Nat. ord., *Umbelliferæ*).

It occurs in irregular masses composed of whitish tears, which are imbedded in a yellowish-gray or brownish-gray sticky mass. It has a persistent alliaceous odor, and a bitter, alliaceous, acrid taste. It is partly

soluble in alcohol, or ether, and yields a milk-white emulsion when triturated with water.

Source: Asia.

Chief constituents. A volatile oil, resin, and sulphur.

#### PREPARATIONS.

Asafoetida . . . . .	0.12-0.60 Gm. gr. ij-x.
Emulsum Asafoetidæ (4 per cent.) . .	7.50-15.00 Cc. ʒ ij-iv.
Pilulæ Asafoetidæ . . . . .	1 = 0.20 Gm. gr. ij.
Pilulæ Aloes et Asafoetidæ . . . . .	1 = 0.09 Gm. gr. 1½.
Tinctura Asafoetidæ (20 per cent.)	0.95-1.90 Cc. ℥ xv-xxx.

#### ACTION.

That of a stimulating expectorant, antispasmodic, laxative and anti-septic.

#### USE.

It may be used in flatulence, especially that occurring in hysterical women. It may be used in spasmodic affections of the respiratory tract, and in certain forms of bronchitis.

#### AMMONIACUM.

##### Ammoniac.

A gum resin obtained from the *Dorema Ammoniacum* (Nat. ord., *Umbelliferae*).

It occurs in roundish tears, externally pale yellowish-brown, internally milk-white. It has a peculiar odor, and a bitter, acrid, and nauseous taste.

Source. Persia.

Chief constituents. A volatile oil, and resin.

#### PREPARATIONS.

Ammoniacum . . . . .	0.30-0.95 Gm. gr. v-xv.
Emulsum Ammoniaci (4 per cent.) . .	7.50-15.00 Cc. ʒ ij-iv.
Emplastrum Ammoniaci.	
Emplastrum Ammoniaci cum Hydrargyro.	

#### ACTION.

That of a stimulating expectorant, anti-spasmodic, and laxative, resembling in a general way the action of asafoetida, but less powerful.

#### USE.

This is of but little therapeutic use. It may be given in chronic bronchitis, etc.

**SUMBUL.****Musk Root.**

The root of the *Ferula Sumbul* (Nat. ord., *Umbelliferae*). It has a strong musk-like odor, and a bitter, balsamic taste.

Habitat. Asia.

Chief constituents. A volatile oil, resins, and valerianic acid.

**PREPARATION.**

Tinctura Sumbul (10 per cent.) . . . 1.90–3.75 Cc.  $3\frac{1}{2}$ –i.

**ACTION.**

Antispasmodic, stimulant, and sedative, resembling valerian in action.

**USE.**

This has but little therapeutic use. Its action suggests what it may be used for, but seldom is, because of the existence of drugs superior to it.

**SAMBUCUS.****Elder.**

The flowers of *Sambucus canadensis* (Nat. ord., *Caprifoliaceae*). These have a peculiar odor, and a sweetish, aromatic, and somewhat bitter taste.

Habitat. North America.

Chief constituents. A volatile oil, tannic acid, and resin.

Dose: 1.90–3.75 Gm  $3\frac{1}{2}$ –i.

**ACTION.**

Stimulant, diaphoretic, diuretic and carminative.

**USE.**

This is used as a domestic remedy, to produce diaphoresis. It is of little therapeutic value.

**VIBURNUM OPULUS.****Cranberry Tree.** Cramp bark.

The bark of the *Viburnum Opulus* (Nat. ord., *Caprifoliaceae*). It is inodorous, and has a bitterish, and very acrid taste.

Habitat. United States.

**PREPARATION.**

Extractum Viburni Opuli Fluidum . . . 1.90–3.75 Cc.  $3\frac{1}{2}$ –j.

**VIBURNUM PRUNIFOLIUM.****Black Haw.**

The bark of the *Viburnum prunifolium* (Nat. ord., *Caprifoliaceae*). It is inodorous, and has a somewhat astringent, and bitter taste.

Habitat. United States.

Chief constituents. Viburnin, valerianic acid, and tannic acid.

#### PREPARATION.

Extractum Viburni Prunifolii Fluidum . . 1.90-3.75 Cc.  $3\frac{1}{2}$ -i.

#### ACTION.

Viburnum is supposed to have a sedative action upon the nervous system. Its action is not well understood.

#### USE.

The viburnum preparations may be used in dysmenorrhœa, in ovarian neuralgia, etc. Their usefulness is doubted by many physicians.

### IPECACUANHA.

#### Ipecac.

Root of the *Cephælis Ipecacuanha* (Nat. ord., *Rubiaceæ*). The odor is slight, peculiar, and nauseous; the taste bitter, acrid, and nauseating.

Habitat. Brazil.

Chief constituents. Emetine, ipecacuanhic acid.

**Emetine**,  $C_{28}H_{40}N_2O_5$ , is white, crystalline, odorless, bitter. Sparingly soluble in cold water; soluble in alcohol and chloroform; destroyed by heat.

Ipecacuanhic acid,  $C_{14}H_{18}O_7$ , resembles quinic acid.

#### PREPARATIONS.

Ipecacuanha (powdered) . . . . 0.005- 0.95 Gm. gr.  $\frac{1}{12}$ -xv.

Extractum Ipecacuanhæ Fluidum . 0.005- 0.95 Cc.  $\mathcal{M}_{12}$ -xv.

Syrupus Ipecacuanhæ (7 per cent.

fl. ext.) . . . . . 0.30 -15.00 Cc.  $\mathcal{M}_V$ - $3\frac{1}{2}$ .

Vinum Ipecacuanhæ (10 per cent.

fl. ext.) . . . . . 0.30 -15.00 Cc.  $\mathcal{M}_V$ - $3\frac{1}{2}$ .

Tinctura Ipecacuanhæ et Opii . . See Opium.

Pulvis Ipecacuanhæ et Opii . . . See Opium.

Trochisci Ipecacuanhæ . . . . .  $\mathcal{I}=0.02$  Gm. gr.  $\frac{1}{3}$ .

Trochisci Morphinæ et Ipecacuanhæ See Morphine.

Ø Emetine . . . . . 0.001-0.01 Gm. gr.  $\frac{1}{80}$ - $\frac{1}{6}$ .

#### ACTION.

Ipecacuanha acts as an irritant locally and along the lines of elimination. Minute doses may have an anti-emetic action, dependent upon mild stimulation of the gastric mucous membrane. Large doses cause emesis through direct irritation of the gastric mucous membrane, and also

through a direct action on the vomiting centre. It is a mild and slow emetic, and is not to be depended upon when prompt emesis is called for, as in cases of poisoning. Small doses may, by mild stimulation, increase gastric and intestinal secretion, thus aiding digestion. Large doses, with emesis prevented, act through the irritant properties of the drug in the intestinal canal, and check abnormal secretions (anti-dysenteric). During elimination by the skin, ipecac causes diaphoresis; during elimination by the bronchial mucous membrane, it increases bronchial secretion; during its passage through the liver it both increases the secretion of bile, and renders it more liquid.

Some individuals are unusually susceptible to the drug, and the smallest amount inhaled will cause sufficient irritation to produce violent sneezing, and asthmatic symptoms.

Tolerance may be established through the continued use of the drug, and it may then fail to cause emesis even when large doses are given.

In medicinal doses it has no marked depressant action, either on the nervous system, or on the circulation. Poisonous doses may cause death by paralysis of heart, or of respiration.

#### USE.

Very small doses of ipecac—0.005–0.01 Gm. (gr.  $\frac{1}{12}$ – $\frac{1}{6}$ )—may be used hourly, or less frequently in some cases, to check nausea or vomiting. Larger doses—0.01–0.02 Gm. (gr.  $\frac{1}{6}$ – $\frac{1}{3}$ )—may be used for its stimulating action throughout the alimentary canal and along the lines of elimination, thus: in dyspepsia; in chronic constipation; in dysenteric diarrhœa; in jaundice; in bronchitis, etc. Still larger doses are used for the emetic effect of the drug, to empty the stomach, or to cause the expulsion of tenacious bronchial secretion. To produce emesis, it is best given in doses of 0.30 Gm. (gr. v), with warm water, every five or ten minutes, until the required effect is secured.

In dysentery, the drug may be given by the rectum—1.90–3.75 Gm. (3½–j)—suspended in a small quantity of fluid. Or large doses—0.60–1.90 Gm. (gr. x–xxx)—may be given by the mouth; emesis is not wanted now; the drug should therefore be given with as little fluid as possible, and the patient should be kept quietly on the back for a time. Should the first few doses excite nausea or vomiting, persistence in the use of the drug soon establishes a condition of tolerance.

#### CINCHONA.

The bark of *Cinchona Calisaya*, *Cinchona officinalis*, and of hybrids of these, and of other species of *Cinchona* (Nat. ord., *Rubiaceæ*), yielding, when assayed, not less than 5 per cent. of total alkaloids, and at least



2.5 per cent. of quinine. This bark has a slightly aromatic odor, and a bitter, somewhat astringent, taste.

Habitat. The western portion of South America.

Chief constituents. Quinine, quinidine, cinchonine, cinchonidine, quinic (or kinic) acid, quinovic acid, and cincho-tannic acid.

#### PREPARATIONS.

Extractum Cinchonæ . . . . . 0.30–0.95 Gm. gr. v–xv.

Extractum Cinchonæ Fluidum . . . . 0.30–0.95 Cc. ℥v–xv.

Infusum Cinchonæ (6 per cent.) . . 30.00–60.00 Cc. ℥i–ij.

Tinctura Cinchonæ (20 per cent.) . . 3.75–7.50 Cc. ℥i–ij.

#### CINCHONA RUBRA.

##### Red Cinchona.

The bark of *Cinchona succirubra* (Nat. ord., *Rubiaceæ*) containing not less than 5 per cent of its peculiar alkaloids. Odor, slight; taste, bitter, and astringent.

#### PREPARATION.

Tinctura Cinchonæ Composita, 3.75–7.50 Cc. ℥i–ij.

**Compound Tincture of Cinchona** (Huxham's Tincture) contains of red cinchona, 10 parts, bitter orange peel, 8 parts, serpentaria, 2 parts, glycerin, and water to 100 parts.

#### ACTION.

Cinchona is antiperiodic, antipyretic, antiseptic, tonic and astringent. The action is well represented by quinine, and its salts, *q. v.*

#### USE.

The cinchona preparations have been quite generally displaced by the alkaloid quinine, *q. v.*

#### QUININA. $C_{20}H_{24}N_2O_2 + 3H_2O$ .

This is an alkaloid obtained from various species of cinchona. It is a white, flaky, amorphous, or crystalline powder; odorless, having a bitter taste, and an alkaline reaction. Permanent in the air. Soluble in 6 parts of alcohol; very sparingly soluble in water at 15° C.

#### PREPARATIONS.

Quininæ Sulphas, . . .	} . . . . 0.06–1.25 Gm. gr. i–xx.
Quininæ Bisulphas, . .	
Quininæ Hydrobromas,	
Quininæ Hydrochloras,	
Quininæ Valerianas . .	

**Quininæ Sulphas**,  $(C_{20}H_{24}N_2O_2)_2H_2SO_4 + 7H_2O$ , occurs in white, silky, light, and fine, needle-shaped crystals; odorless, and having a persistent, very bitter taste. Soluble, at  $15^\circ C.$ , in 740 parts of water, and in 65 parts of alcohol. It may readily be dissolved by the addition of a few drops of diluted sulphuric acid.

**Quininæ Bisulphas**,  $C_{20}H_{24}N_2O_2H_2SO_4 + 7H_2O$ , occurs as colorless, transparent, or whitish crystals, or small needles; odorless, and having a very bitter taste. Soluble, at  $15^\circ C.$ , in 10 parts of water, and in 32 parts of alcohol.

**Quininæ Hydrobromas**,  $C_{20}H_{24}N_2O_2HBr + H_2O$ , occurs in white, light, silky needles; odorless, and having a very bitter taste. Soluble, at  $15^\circ C.$ , in 54 parts of water, and in 0.6 part of alcohol.

**Quininæ Hydrochloras**,  $C_{20}H_{24}N_2O_2HCl + 2H_2O$ , occurs in white, silky, light, and fine, needle-shaped crystals; odorless, and having a very bitter taste. Soluble, at  $15^\circ C.$ , in 36 parts of water, and in 3 parts of alcohol.

**Quininæ Valerianas**,  $C_{20}H_{24}N_2O_2C_5H_{10}O_2 + H_2O$ , occurs as white, or nearly white, pearly, lustrous crystals, having a slight odor of valerianic acid, and a bitter taste. Soluble, at  $15^\circ C.$ , in 100 parts of water, and in 5 parts of alcohol.

#### ACTION.

Quinine destroys certain low animal and vegetable organisms. It also diminishes fermentation. It has quite marked antiseptic action.

Quinine has a very bitter taste, and when taken per orem this causes, by reflex action, an increased secretion of saliva and of gastric juice, and increased appetite, thus acting as a tonic. If the stomach is already in an irritable condition, quinine may cause nausea and vomiting. It has no influence on the secretion of bile, but it forms with bile a salt that is but sparingly soluble, except in an excess of bile.

In the circulation it diminishes the power of the red blood-corpuscles for giving up oxygen. Tissue change throughout the body is diminished (diminished oxidation), and temperature, in febrile condition, is lowered; this is its antipyretic action.

Its specific action as an antiperiodic, in malaria, is due to its power of destroying the plasmodium malarix.

Cinchona has a slight astringent action because of the cincho-tannic acid which it contains. Both cinchona and quinine have a slight local hæmostatic action, (1) through their irritant properties reflexly causing contraction of the blood-vessels; (2) through their astringent action.

In the parturient woman, quinine strengthens normal uterine contractions. It does not cause abortion.

Upon the nervous system quinine acts as a stimulant in small doses;

as a congestant in large doses, and as a result of this latter condition, there may occur a condition, termed *cinchonism*, characterized by dizziness, ringing in the ears, headache, etc.

Reflex excitability is diminished, through stimulation of the reflexinhibitory centre.

On the circulation and respiration quinine acts as a stimulant in small doses ; a depressant in large doses.

Elimination takes place chiefly through the kidneys. Much of the quinine is destroyed by oxidation in the tissues.

#### USE.

Quinine is seldom used in its own form ; it is to the more soluble salts that we look for its therapeutic agents. Of these the sulphate is the one in most general use. It may be given in doses of 0.06 to 0.12 Gm. (gr. j to ij) as a simple bitter, or tonic, when such remedies are required. As a general antipyretic agent the quinine salts are not used nearly so much as in former days ; when necessary, however, 0.12 to 0.30 Gm. (gr. ij-v) doses may be used as required. In the treatment of malarial diseases the quinine salts hold first place ; it is given in doses ranging from 0.30 to 1.25 Gm. (gr. v-xx). During parturition, when the labor pains have grown feeble, because of exhaustion, quinine is a most useful oxytocic ; the dose required is from 0.30 to 0.60 Gm. (gr. v-x.).

**QUINIDINÆ SULPHAS.**  $(C_{20}H_{24}N_2O_2)_2H_2SO_4 + 2H_2O$ .

#### Quinidine Sulphate.

This is the neutral sulphate of an alkaloid obtained from the bark of several species of cinchona.

It occurs in white, silky needles ; odorless, and having a bitter taste. It is sparingly soluble in water ; soluble in alcohol.

Dose : 0.12-1.90 Gm. gr. ij-xxx.

#### ACTION.

This has the general action of the quinine salts, but to a less marked degree.

#### USE.

This is a poor substitute for the quinine salts.

**CINCHONINA.**  $C_{19}H_{22}N_2O$ .

#### Cinchonine.

This is an alkaloid obtained from the bark of various species of cinchona. It occurs in white, lustrous prisms or crystals. It is odorless ; almost tasteless at first, but soon develops a bitter after-taste. Sparingly soluble in water, and in alcohol.

## PREPARATIONS.

Cinchonina . . . . . } 0.12-1.90 Gm. gr. ij-xxx.  
 Cinchoninæ Sulphas . . . . . }

**Cinchoninæ Sulphas**,  $(C_{19}H_{22}N_2O)_2H_2SO_4 + 2H_2O$ , occurs in hard, white, lustrous crystals, without odor, and having a bitter taste. Soluble, at  $15^\circ C.$ , in 66 parts of water, and in 10 parts of alcohol.

## ACTION.

The preparations of cinchonina have the general, though less marked, action of the quinine salts.

## USE.

The cinchonina preparations are poor substitutes therapeutically, for the quinine salts.

**CINCHONIDINÆ SULPHAS**.  $(C_{19}H_{22}N_2O)_2H_2SO_4 + 3H_2O$ .

**Cinchonidine Sulphas.**

This is the neutral sulphate of an alkaloid obtained from the bark of various species of cinchona.

It occurs as white, silky crystals; without odor, and having a very bitter taste. Soluble, at  $15^\circ C.$ , in 70 parts of water, and 66 parts of alcohol.

Dose: 0.12-1.90 Gm. gr. ij-xxx.

## ACTION.

That of the quinine salts, but to a less marked degree.

## USE.

This is a poor substitute therapeutically, for the quinine salts.

**CAFFEINA**.  $C_8H_{10}N_4O_2 + H_2O$ .

**Caffeine.** Theine.

A feebly basic, proximate principle, obtained from the dried leaves of *Thea sinensis* (Nat. ord., *Ternstræmiaceæ*), or from the dried seeds of *Coffea arabica* (Nat. ord., *Rubiaceæ*), and also found in other plants.

It occurs in fleecy masses of long, flexible, white crystals, possessing a silky lustre, without odor, having a bitter taste, a neutral reaction, and permanent in the air. Soluble, at  $15^\circ C.$ , in 80 parts of water, and in 33 parts of alcohol.

Dose: 0.06-0.30 Gm., gr. i-v.

## PREPARATIONS.

Caffeina . . . . . 0.06-0.30 Gm. gr. j-v.  
 Caffeina Citrata . . . . . 0.18-0.60 Gm. gr. iij-x.  
 Caffeina Citrata Effervescens . . . . . 3.75-7.50 Gm. ʒi-ij.

**Caffeina Citrata.** This is a mechanical mixture, not a chemical salt. It contains 50 per cent. of caffeine. It must be kept in well-closed bottles.

It is a white powder; odorless, having a purely acid taste, and an acid reaction. It forms a syrupy solution with 3 parts of water; on further dilution this yields a precipitate (caffeine), which redissolves when about 25 parts of water have been added.

**Caffeina Citrata Effervescens.** This is caffeine with citric acid, sodium bicarbonate, tartaric acid, sugar and alcohol. It is in the form of a coarse, granular powder, and must be kept in well-stoppered bottles. A heaping teaspoonful contains nearly 1 grain of caffeine (the mixture has 1 grain of caffeine in 100).

#### ACTION.

Caffeine, and its preparations, has a stimulating action upon the nervous system. It increases rapidity of thought, through its action on cerebral centres; increases reflex excitability, through its action on the spinal cord. The pulse rate is increased, through stimulation of the nervous system; blood-pressure is also increased. Large doses have a general paralyzing action. Caffeine is diuretic through stimulation of the secreting cells of the kidneys, as well as through increased blood-pressure from its action on the heart, and circulation.

The continued use of caffeine (or its sources, tea, coffee, etc.), causes a condition known as "nervousness." This is due to the continued stimulation of the nervous system, and especially stimulation of the spinal cord.

#### USE.

Caffeine is often useful in the treatment of certain forms of headache. It is a useful cardiac tonic in organic heart disease with deficient compensatory hypertrophy; or in enfeebled heart's action during the progress of some acute disease. As a respiratory stimulant it is useful in opium poisoning. As a diuretic it may be used when there is no acute inflammation of the kidneys present.

#### VALERIANA.

##### Valerian.

The rhizome and roots of the *Valeriana officinalis* (Nat. ord., *Valerianæ*). The odor is peculiar; the taste camphoraceous and somewhat bitter.

Habitat. Europe.

Chief constituents. A volatile oil, and valerianic acid.



## PREPARATIONS.

Extractum Valerianæ Fluidum . . . .	1.90-3.75 Cc.	3½-i.
Tinctura Valerianæ (20 per cent.) . . .	3.75-7.50 Cc.	3i-ij.
Tinctura Valerianæ Ammoniata (20 per cent.) . . . . .	1.90-3.75 Cc.	3½-i.
Ammonii Valerianas,                    }	. . . . . 0.06-0.30 Gm.	gr. i-v.
Ferri Valerianas,                       }		
Quininæ Valerianas,                   }		
Zinci Valerianas . . . . .	0.01-0.06 Gm.	gr. ¼-i.

## ACTION.

The activity of valerian is due to the volatile oil that it contains, rather than to the valerianic acid. It has a gentle stimulating action on the nervous system, and on the circulation. It quiets excessive reflex excitability, and is also anti-spasmodic.

## USE.

In the treatment of hysteria the preparations of valerian have held a prominent place.

## TARAXACUM.

**Dandelion.**

The root of the *Taraxacum officinale* (Nat. ord., *Compositæ*). It is inodorous, and has a bitter taste.

Habitat. Europe, North America.

Chief constituents. Taraxacin; potassium, and calcium, salts.

## PREPARATIONS.

Extractum Taraxaci . . . . .	1.25-3.75 Gm.	gr. xx-zi.
Extractum Taraxaci Fluidum . . . . .	3.75-7.50 Cc.	3i-ij.

## ACTION.

That of a bitter tonic. It is supposed to possess the properties of an hepatic stimulant. The dried stale root is inert.

## USE.

This is an unimportant therapeutic agent. It may be used in some forms of dyspepsia.

## PYRETHRUM.

**Pellitory-root.**

The root of the *Anacyclus Pyrethrum* (Nat. ord., *Compositæ*). It is inodorous, and has a pungent, and very acrid taste.

Habitat. The Mediterranean basin.

Chief constituents. Volatile and fixed oils, and resin.

## PREPARATION.

Tinctura Pyrethri (20 per cent.) . . . . . For local use.

## ACTION.

That of a local irritant, and sialagogue.

## USE.

This is another unimportant therapeutic agent. It may be used in nervous aphonia ; in paralysis of the tongue, or muscles of the throat ; in toothache, etc.

## INULA.

**Elecampane.**

The root of *Inula Helenium* (Nat. ord., *Compositæ*). The odor is peculiar and aromatic ; the taste bitter and pungent.

Habitat. Central and Southern Europe.

Chief constituents. A volatile oil, inulin, and helenin.

Dose, 0.60–1.25 Gm. gr. x–xxx.

## ACTION.

That of a stimulant along the lines of elimination : hence, a diaphoretic, diuretic, and expectorant.

## USE.

An unimportant therapeutic agent. It may be used (by preference in the form of an infusion) as an expectorant.

## LAPPA.

**Burdock.**

The root of *Arctium Lappa* and of some other species of *Arctium* (Nat. ord., *Compositæ*). The odor is feeble and unpleasant ; taste mucilaginous, sweetish, and somewhat bitter.

Habitat. Europe, and Asia.

Chief constituents. Inulin, and tannic acid.

Dose : 1.90–375 Gm. 3½–i.

## ACTION.

Diuretic, diaphoretic, and alterative.

## USE.

An unimportant therapeutic agent. Seldom used except as an ingredient in proprietary vegetable, so-called specific, mixtures for use in the treatment of syphilis.

## ARNICA.

**Leopards-bane.**

The flower heads, also the rhizome and roots of the *Arnica Montana* (Nat. ord., *Compositæ*). Both the flowers and the root have a feeble, aromatic odor, and a bitter, acrid taste.

Habitat. Europe, Asia, North America.

Chief constituents. A volatile oil, and tannic acid.

## PREPARATIONS.

Tinctura Arnicæ Florum (20 per cent.) . 0.60–1.90 Cc. ℥ x-xxx.

Tinctura Arnicæ Radicis (10 per cent.) . 0.60–1.90 Cc. ℥ x-xxx.

Extractum Arnicæ Radicis . . . . . 0.18–0.30 Gm. gr. iij–v.

Extractum Arnicæ Radicis Fluidum . . 0.30–0.60 Cc. ℥ v–x.

Emplastrum Arnica ( $\frac{1}{3}$  Ext.) . . . . . For external use.

## ACTION.

Locally, stimulant, causing slight redness if evaporation is prevented. It may have a slight local astringent action, due to the small amount of tannin present. Internally, by its stimulating effect it gives rise to a feeling of warmth throughout the alimentary canal. It also increases peristalsis.

## USE.

This is an over-rated therapeutic agent in quite general use by the laity in the treatment of bruises, sprains, etc. It is but little used by modern physicians.

## EUPATORIUM.

**Thoroughwort.** Bone-set Indian Sage.

The leaves and flowering tops of the *Eupatorium perfoliatum* (Nat. ord., *Compositæ*). The odor is weak and aromatic; taste, astringent and bitter.

Habitat. United States.

Chief constituents. A volatile oil, and eupatorin.

## PREPARATION.

Extractum Eupatorii Fluidum . . . . 1.25–1.90 Cc. ℥ xx-xxx.

## ACTION.

Stimulant, a bitter tonic, diaphoretic, and expectorant. Large doses are emetic, and cathartic.

## USE.

This is another unimportant drug. In domestic practice it is used to ward off a cold.

## GRINDELIA.

The leaves and flowering tops of the *Grindelia robusta* and of *Grin-*

*delia squarrosa* (Nat. ord., *Compositæ*). The odor is balsamic; taste, aromatic, pungent, and bitter.

Habitat. North America.

#### PREPARATION.

Extractum Grindeliæ Fluidum . . . . . 1.90-3.75 Cc.  $3\frac{1}{2}$ -i.

#### ACTION.

Antispasmodic, and sedative.

#### USE.

Another unimportant drug. It may be used in the treatment of asthma, bronchitis, etc.

#### TANACETUM.

##### Tansy.

The leaves and tops of the *Tanacetum vulgare* (Nat. ord., *Compositæ*). The odor is strongly aromatic; taste, pungent, and bitter.

Habitat. Europe, and United States.

Chief constituents. A volatile oil, and tannic acid.

Dose: 1.90-3.75 Gm.  $3\frac{1}{2}$ -i.

#### ACTION.

Tonic, emmenagogue.

#### USE.

Another unimportant drug. In domestic practice it is used in the treatment of amenorrhœa.

#### ABSINTHIUM.

##### Wormwood.

The leaves and tops of *Artemisia Absinthium* (Nat. ord., *Compositæ*). The odor is aromatic; taste, persistently bitter.

Habitat. Europe.

Chief constituents. A volatile oil, absinthin, and tannic acid.

Dose: 0.90-3.75 Gm. gr. xv- $\text{ʒi}$ .

#### ACTION.

Tonic, and stimulant.

#### USE.

Another unimportant drug. It has no therapeutic use.

#### OLEUM ERIGERONTIS.

##### Oil of Erigeron. Oil of Flea-bane.

A volatile oil, distilled from the fresh flowing herb of *Erigeron canadense* (Nat. ord., *Compositæ*).

It is a pale yellow, limpid liquid, becoming darker and thicker by age and exposure to the air, having a peculiar aromatic, and persistent odor,

and an aromatic, slightly pungent taste, resembling that of turpentine.  
Sp. gr., about 0.850, at 15° C.

Dose: 0.30-0.95 Cc. ℥v-xv.

#### ACTION.

Hæmostatic; stimulating along the lines of elimination.

#### USE.

This is another unimportant drug. It may be used locally to arrest hemorrhages.

### LACTUCARIUM.

#### Lettuce.

The concrete milk juice of the *Lactuca virosa* (Nat. ord., *Compositæ*).  
The odor is heavy, somewhat narcotic; taste, bitter.

Habitat. Europe.

Chief constituent. Lactucin.

#### PREPARATIONS.

Lactucarium (powdered) . . . . . 0.30- 1.25 Gm. gr. v-xx.

Syrupus Lactucarii (10 per cent. tincture) , 3.75-7.50 Cc. ʒi-ij.

Tinctura Lactucarii (50 per cent.) . . . . 1.90- 3.75 Cc. ʒ½-i.

#### ACTION.

Hypnotic, resembling opium but much feebler, and without depressing after-effects.

#### USE.

Another unimportant drug. It may be used as a poor substitute for opium.

### MATRICARIA.

#### German Chamomile.

The flower heads of the *Matricaria Chamomila* (Nat. ord., *Compositæ*).

The odor is strongly aromatic; taste bitter, and aromatic.

Habitat. Europe and Asia.

Chief constituents. A volatile oil, and a bitter principle.

Dose: 0.95-1.90 Gm. ʒ½-i.

#### ACTION.

Stimulant, tonic, and diaphoretic.

#### USE.

Another unimportant drug. It is used in domestic practice (in the form of an infusion) to prevent colic, or to produce diaphoresis.



## ANTHEMIS.

## Chamomile.

The flower heads of the *Anthemis nobilis* (Nat. ord., *Compositæ*).

The odor is agreeable; taste aromatic, and bitter.

Habitat. Europe.

Chief constituents. A volatile oil, and a bitter principle.

Dose: 0.95–1.90 Gm. gr. xv–xxx.

## ACTION.

Stimulant, tonic, and diaphoretic.

## USE.

Another unimportant drug. It may be used (in the form of an infusion), to prevent, or to relieve colic.

## SANTONICA.

## Levant Worm-seed.

The unexpanded flower heads of the *Artemisia pauciflora* (Nat. ord., *Compositæ*).

Odor strong, peculiar, somewhat camphoraceous; taste aromatic, and bitter.

Habitat. Persia, Asia Minor.

Chief constituents. Santonin, and a volatile oil.

## ACTION AND USE.

That of santoninum, *q. v.*

SANTONINUM.  $C_{15}H_{18}O_3$ .

## Santonin.

This occurs in colorless, shining, flattened crystals, not altered by exposure to air, but turning yellow on exposure to light; odorless, and nearly tasteless, or slightly bitter, and having a neutral reaction. Nearly insoluble in water.

## PREPARATIONS.

Santoninum . . . . . 0.03–0.24 Gm. gr.  $\frac{1}{2}$ –iv.

Trochisci Santonini . . . . . 1 = 0.03 Gm. gr.  $\frac{1}{2}$ .

## ACTION.

Anthelmintic. It destroys the round worm (*ascaris lumbricoides*), and thread worm (*oxyuris vermicularis*).

The constitutional action which the soluble salts of santonin are capable of producing is toxic rather than therapeutic.

## USE.

Santonin is used to cause the destruction and expulsion of the round worm, or the thread worm, from the intestinal canal. It should be given after fasting,—at bed-time or in the early morning. The drug must not be used continuously, for fear of producing the annoying physiological symptoms described under its toxicology.

## TOXICOLOGY.

A small amount of santonin may be absorbed after chemical change, as the sodium santoninate, producing the following constitutional symptoms: a peculiar disturbance of vision,—everything appearing first bluish, and later yellowish or greenish-yellow; the blue disturbance lasts but a short time; the yellow vision lasts much longer. This is supposed to be due, first, to stimulation, and later, paralysis of those fibres of the retina by which blue light is perceived. Large doses may cause headache, giddiness, vomiting, and death by convulsions, with a tendency to paralysis of respiration between the convulsions.

Elimination takes place through the kidneys as a sodium salt, giving to the urine a bright yellow color, which changes to a blood-red if the urine is made alkaline.

*Treatment.*—Stop the drug; hasten the elimination of the drug already absorbed; treat symptoms requiring attention as they may arise.

## CALENDULA.

**Marigold.**

The florets of the *Calendula officinalis* (Nat. ord., *Compositæ*).

The odor is slight, and somewhat heavy; taste bitter, and faintly saline.

Habitat. Europe.

Chief constituent. A volatile oil.

## PREPARATION.

Tinctura Calendulæ (20 per cent.) . . . . . For external use.

## ACTION.

Stimulant, diaphoretic, and a weak astringent.

## USE.

This is another unimportant drug. The tincture may be used in the treatment of sprains, bruises, etc., after the manner of arnica.

## LOBELIA.

**Indian Tobacco.**

The leaves and tops of the *Lobelia inflata* (Nat. ord., *Lobeliaceæ*). Odor slight, irritating; taste mild, afterwards burning, and acid.

Habitat. United States.

Chief constituents. A volatile oil, resin, and lobelin.

## PREPARATIONS.

Extractum Lobeliæ Fluidum . . . . . 0.06-0.30 Cc. ℥i-v.  
 Tinctura Lobeliæ (20 per cent.) . . . . . 0.95-3.75 Cc. ℥xv-zi.

## ACTION.

A stimulant along the lines of elimination, and hence ; diaphoretic, expectorant, and emetic.

## USE.

Another unimportant drug. Its use is confined to domestic practice.

## UVA URSI.

**Bearberry.**

The leaves of the *Arctostaphylos Uva-ursi* (Nat. ord., *Ericaceæ*). Odor faint, hay-like ; taste strongly astringent, and bitter.

Habitat. United States.

Chief constituents. Tannic acid, and arbutin.

**Arbutin**,  $C_{12}H_{16}O_7$ , is in long colorless crystals, having a bitter taste. Soluble in water, alcohol and ether.

## PREPARATIONS.

Extractum Uvæ Ursi . . . . . 0.18-0.30 Gm. gr. iij-v.  
 Extractum Uvæ Ursi Fluidum . . . . . 1.90-3.75 Cc. ʒ½-i.  
 ♂ Arbutin . . . . . 0.30-0.60 Gm. gr. v-x.

## ACTION.

Diuretic, and astringent ; antiseptic, and stimulating along the lines of elimination, viz. : throughout the urinary tract. Action is due to the arbutin ; part of the arbutin is decomposed in the body, yielding hydroquinone, and to this it owes its antiseptic, and stimulating action.

## USE.

The preparations of uva ursi, or by preference *arbutin*, are used therapeutically in diseases of the urinary tract—certain diseases of the kidneys, cystitis, etc.

## CHIMAPHILA.

**Pipsissewa.** Wintergreen.

The leaves of the *Chimaphila umbellata* (Nat. ord., *Ericaceæ*). These are nearly inodorous and have an astringent, bitter taste.

Habitat. Northern Hemisphere.

Chief constituents. Arbutin, and tannic acid.

## PREPARATION.

Extractum Chimaphilæ Fluidum . . . . . 1.90-3.75 Cc. ʒ½-i.

## ACTION.

Diuretic, and astringent ; antiseptic and stimulating along the lines of elimination, viz. : throughout the urinary tract.

## USE.

The use of *chimaphila* is quite similar to that of *uva-ursi*, as both owe their action largely to the *arbutin* which they contain.

## BENZOINUM.

**Benzoin.**

A balsamic resin obtained from *Styrax Benzoin* (Nat. ord., *Styracæ*). It occurs in lumps of agglutinated yellowish-brown tears, or in a reddish-brown mass. It is soluble in alcohol. It has an agreeable, balsamic odor, and an aromatic taste.

Chief constituents. Benzoic acid, and resins.

## PREPARATIONS.

*Adeps Benzoinatus* (2 per cent.) . . . . . For external use.

*Tinctura Benzoini* (20 per cent.) . . . . . 0.30-0.95 Cc. ℞v-xv.

*Tinctura Benzoini Composita* (12 per cent.) . . 0.60-1.90 Cc. ℞x-xxx.

**Tinctura Benzoini Composita** (Friar's Balsam) is composed of benzoin 12, storax 8, aloes 2, balsam tolu 4 parts, with alcohol to 100 parts.

## ACTION.

That of a stimulant and antiseptic locally, and along the lines of elimination, viz. : throughout the respiratory, and the urinary tract.

## USE.

Benzoin is used—chiefly in the form of the compound tincture—locally in the treatment of certain forms of skin disease. It is also used in diseases of the respiratory tract either by direct application (as in the pharynx), or by inhalation.

ACIDUM BENZOICUM.  $\text{HC}_7\text{H}_5\text{O}_2$ .**Benzoic Acid.**

This occurs in white, soft, feathery crystals, not pulverulent ; odorless or having a peculiar, agreeable, aromatic odor ; a warm, acrid and acidulous taste. Sparingly soluble in cold water ; soluble in 15 parts of boiling water ; in 3 parts of alcohol, and in 3 parts of ether.

## ACTION.

Locally, stimulant and irritant to raw surfaces ; it is also antiseptic. Internally, after absorption it is in part eliminated by the bronchial

mucous membrane, and acts as a stimulating expectorant. It is eliminated chiefly by the kidneys as hippuric acid; this acid increases the acidity of the urine, and makes it somewhat irritating; the irritant action of the acid makes it also diuretic.

#### PREPARATIONS.

Acidum Benzoicum . . . . .	0.30-0.95 Gm. gr. v-xv.
Ammonii Benzoas . . . . .	0.30-0.95 Gm. gr. v-xv.
Lithii Benzoas . . . . .	0.30-0.95 Gm. gr. v-xv.
Sodii Benzoas . . . . .	0.30-0.95 Gm. gr. v-xv.

#### AMMONII BENZOAS. $\text{NH}_4\text{C}_7\text{H}_5\text{O}_2$ .

##### Ammonium Benzoate.

This should be kept in well-stoppered bottles. It gradually loses ammonia when exposed to the air. It occurs in thin, white, four sided laminar crystals; odorless, or having a slight odor of benzoic acid; a saline, bitter, afterwards slightly acid, taste. Soluble, at  $15^\circ \text{C}$ ., in 5 parts of water, and in 28 parts of alcohol.

#### ACTION.

That of benzoic acid, influenced by the presence of ammonia.

#### USE.

Because of its greater solubility, this salt is generally preferred to the benzoic acid for internal administration. As benzoic acid is eliminated in the urine as hippuric acid, and ammonia is eliminated as nitric acid, this salt is an excellent preparation for use when we wish to change the reaction of alkaline urine, or to increase the acidity of urine; as in cystitis, etc.

#### LITHII BENZOAS. $\text{LiC}_7\text{H}_5\text{O}_2$ .

##### Lithium Benzoate.

This occurs as a light, white powder, or as small, shining, crystalline scales. It is odorless, or has a faint, benzoin-like odor; the taste is sweetish. Soluble in 4 parts of water, and in 12 parts of alcohol.

#### ACTION.

That of benzoic acid.

#### USE.

This salt has no important therapeutic place.

#### SODII BENZOAS. $\text{NaC}_7\text{H}_5\text{O}_2$ .

##### Sodium Benzoate.

This should be kept in well-stoppered bottles.



It is a white amorphous powder; odorless, or having a faint odor of benzoin, and a sweetish, astringent taste. Soluble, at 15° C., in 1.8 parts of water, and in 45 parts of alcohol.

#### ACTION.

That of Benzoic acid.

#### USE.

This salt has no prominent place as a therapeutic agent. It has been used in the treatment of phthisis, but there are now other remedies superior to this one as an antiseptic throughout the respiratory tract.

#### MANNA.

This is a concrete, saccharine exudation of *Fraxinus Ornus* (Nat. ord., *Oleaceæ*).

It occurs in flattish pieces; friable; yellowish-white externally; white, porous, and crystalline internally. The odor is honey-like; taste sweetish, afterward nauseous. Soluble in water, or in alcohol.

Chief constituents. Mannite, and a nauseous principle.

#### PREPARATION.

Infusum Sennæ Compositum (12 per cent.) 60.00–120.00 Cc. ℥ij–iv.

#### ACTION.

Laxative.

#### USE.

This is but rarely used—and then only in combination with other drugs for its laxative action.

#### OLEUM OLIVÆ.

**Olive Oil.** Sweet Oil.

A fixed oil expressed from the ripe fruit of the *Olea europæa* (Nat. ord., *Oleaceæ*).

It is of a pale yellow, or light greenish-yellow color, with a slight, agreeable odor, a bland taste, and a neutral reaction. Insoluble in water; sparingly soluble in alcohol; freely soluble in ether. Sp. gr., 0.915–0.918.

Chief constituents of the oil. Olein, palmitin, stearin, and cholesterin.

Dose: 30.00–60.00 Cc. ℥i–ij.

#### PREPARATIONS.

Various plasters, and Diachylon ointment.

#### ACTION.

Emollient, demulcent, nutritive, and slightly laxative.

## USE.

Locally it may be used as an emollient, and as a protectant dressing. It may be used as an enema, to soften scybalæ. It has been used of late in the treatment of hepatic colic, but its only action here is that of an emollient—not that of a solvent for the gall stones.

## SAPO.

**Soap.** White Castile Soap. Hard Soap.

This is prepared from soda, and olive oil.

It occurs as a white, or whitish solid, hard, yet easily cut when fresh; having a faint, peculiar odor free from rancidity, a disagreeable, alkaline taste, and an alkaline reaction. Soluble in water, and in alcohol.

## PREPARATIONS.

Emplastrum Saponis (10 per cent.) . . . . For external use.

Linimentum Saponis (7 per cent.) . . . . For external use.

## ACTION.

That of an antacid, laxative, detergent, and mild local stimulant. (Compare with Sapo Mollis, p. 241.)

## USE.

Soap is used for its cleansing properties, in general surgery; in skin diseases; etc. Its antacid, and mild stimulating, qualities are also of value sometimes, in skin diseases. As an enema, or suppository, it may be used for its laxative action.

## APOCYNUM.

**Canadian Hemp.**

The root of *Apocynum Cannabinum* (Nat. ord., *Apocynaceæ*). It is inodorous, and has a bitter, disagreeable taste.

Habitat. United States.

Chief constituents. Apocynin, and tannic acid.

## PREPARATIONS.

Extractum Apocyni Fluidum . . . . 0.30–1.90 Cc. gr. v–xxx.

## ACTION.

That of a stimulant along the lines of elimination; hence, a diuretic, diaphoretic, or expectorant in small doses; an emetic, or cathartic in large doses. It has also the action of a cardiac tonic.

## USE.

It may be used in some dropsical conditions, either for its action on the heart, or as an evacuant.

### ASPIDOSPERMA

#### Quebracho.

The bark of *Aspidosperma Quebracho-blanco* (Nat. ord., *Apocynaceæ*).  
Odor, slight; taste, aromatic and bitter.

Habitat. Argentine Republic.

Chief constituents. Several alkaloids, and tannic acid.

#### PREPARATION.

Extractum Aspidospermatis Fluidum . . 0.30–0.60 Cc. M<sub>v</sub>–x.

#### ACTION.

Antispasmodic, through a sedative action on the nervous system. It seems to have a special action upon respiration, and promptly removes certain forms of dyspnoea in diseases of the respiratory, or circulatory, apparatus. It may cause diaphoresis, salivation, and nausea.

#### USE.

It may be used to relieve the dyspnoea of asthma.

### STROPHANTHUS.

#### Kombe. Arrow Poison. Inee.

The seed of *Strophanthus hispidus* (Nat. ord., *Apocynaceæ*), deprived of its long awn. It is almost odorless; the taste is bitter.

Habitat. Africa.

Chief constituents. *Strophanthin*,  $C_{31}H_{48}O_{12}$ , an imperfectly crystalline substance with a neutral reaction and very bitter taste. Soluble in water, and in alcohol; nearly insoluble in ether.

#### PREPARATIONS.

Tinctura Strophanthi (5 per cent.) . 0.30–0.60 Cc. M<sub>v</sub>–x.

ϕ Strophanthin . . . . . 0.001–0.002 Gm. gr.  $\frac{1}{80}$ – $\frac{1}{30}$ .

#### ACTION.

Strophanthus has practically the action of digitalis. See p. 317. It is a good alternate to use with digitalis. Certain advantages are claimed for strophanthus, viz.: that it is non-cumulative; that it causes less disturbance of the alimentary canal; that it has a more marked diuretic action; that it has a peculiar, but less prolonged action on the heart muscle, hence, more of a cardiac stimulant, and less of a cardiac tonic than digitalis.

#### USE.

Strophanthus may be used alone, or as an alternate with digitalis, in

the treatment of organic heart disease. Also in dropsy, due to heart disease.

### ASCLEPIAS.

#### Pleurisy-root.

The root of the *Asclepias tuberosa* (Nat. ord., *Asclepiadaceæ*). This is odorless, with a bitter, acrid taste.

Chief constituents. Resins, tannic acid, etc.

#### PREPARATION.

Extractum Asclepiadis Fluidum . . . . 0.30-1.25 Cc. ℥v-xx.

#### ACTION.

Diaphoretic, expectorant, and emetic.

#### USE.

This is an unimportant therapeutic agent. It may be used in bronchitis, etc.

### NUX VOMICA.

#### Poison-nut. Quaker-button.

The seeds of the *Strychnos Nux-vomica* (Nat. ord. *Loganiaceæ*). It is inodorous; the taste is extremely bitter.

Habitat. East Indies.

Chief constituents. Strychnine, and brucine.

#### PREPARATIONS.

Extractum Nucis Vomicae . . . . 0.01-0.03 Gm. gr.  $\frac{1}{6}$  to  $\frac{1}{2}$ .

Extractum Nucis Vomicae Fluidum . . 0.06-0.18 Cc. ℥ i.-iij.

Tinctura Nucis Vomicae (2 per cent.) . 0.18-0.36 Cc. ℥ iij.-vi.

#### ACTION AND USE.

The action and use of nux-vomica is practically that of strychnine, *q. v.*

### STRYCHNINA. $C_{21}H_{22}N_2O_2$ .

#### Strychnine.

This is an alkaloid obtained from nux-vomica and from other plants belonging to the same natural order, notably, *Ignatia*.

It occurs in colorless, transparent crystals, or as a white crystalline powder; odorless, and having an intensely bitter taste. Sparingly soluble in water, and in alcohol.

**Strychnina Sulphas**  $(C_{21}H_{22}N_2O_2)_2H_2SO_4 + 5H_2O$ .—occurs as colorless or white crystals; odorless, and having an intensely bitter taste. Soluble, at 15° C., in 50 parts of water, and in 109 parts of alcohol; soluble in 2 parts of boiling water.

Dose: 0.001-0.01 Gm., gr.  $\frac{1}{80}$  to  $\frac{1}{8}$ .

## ACTION.

Strychnine has the action of a bitter tonic, an excito-motor, and a poison. In the alimentary canal it acts as a bitter, and through reflex action increases secretion, and increases peristalsis.

Its chief action is exerted upon the nervous system. Reflex action is greatly increased. If the dose is large, this increase is so great as to cause convulsions and death. It stimulates the accelerator and augmentor mechanism of the heart, increasing its force and rate. It increases arterial tension, by stimulation of the vaso-motor centre directly. By stimulation of the respiratory centre, the respirations are rendered deeper and quicker. The sensory nerves are made so susceptible that the slightest impression is most distinctly felt. Small doses increase mental activity, and the special senses of vision, and hearing, are both more acute. It has a slight action in diminishing oxidation, and also in lessening fermentation. Death results from arrested respiration, through tetanic fixation of the respiratory muscles.

Elimination takes place slowly through the kidneys. A large part of the drug is oxidized in the system.

## USE.

The official strychnine sulphate, because more soluble, is used rather than the alkaloid itself.

It may be used after the manner of a bitter tonic in digestive disturbances. It may be used in habitual constipation, to increase intestinal peristalsis. It may be used in functional nervous atony, but is absolutely harmful during any acute disease of the nervous system.

Strychnine has come to be recognized as one of our best cardiac and respiratory stimulants. It is a most useful drug in the treatment of pneumonia—the dose, generally a large one,—being regulated by the needs of the case. It may be used hypodermatically in chloroform poisoning, in opium poisoning, in surgical shock, etc.

## TOXICOLOGY.

The first symptoms of poisoning from the therapeutic use of this drug are restlessness, and muscular twitching. Large doses give rise to tetanic muscular spasms, extreme anxiety, dyspnoea during the paroxysms due to fixation of the respiratory muscles, and death.

*Treatment.*—Wash out the stomach, if possible; use tannic acid as a chemical antidote; use chloroform to control the spasms. Chloral also may be used as a physiological antidote.



## GELSEMIUM.

## Yellow Jasmine.

The rhizome and roots of the *Gelsemium sempervirens* (Nat. ord., *Loganiaceæ*). The odor is aromatic; the taste bitter.

Habitat. Southern States.

Chief constituents. Gelsemine, and a volatile oil.

**Gelsemine**,  $C_{12}H_{14}NO_2$ , is a bitter, transparent solid, crystallizing with difficulty from alcohol.

## PREPARATIONS.

Extractum Gelsemii Fluidum . . . . 0.12–0.30 Cc. ℞ ij–v.

Tinctura Gelsemii (15 per cent.) . . . . 0.30–0.95 Cc. ℞ v–xv.

♯ Gelsemine . . . . . 0.001–0.002 Gm. gr.  $\frac{1}{80}$ – $\frac{1}{40}$ .

## ACTION.

Gelsemium is a decided motor depressant. Sensation is diminished, through paralysis of the sensory side of the spinal cord; the motor tracts are depressed later. The heart's action is made slower by a small dose, but large doses give rise to feeble, and rapid action; the vagus is paralyzed. Blood-pressure is not affected by medicinal doses, but large doses cause a fall in arterial tension through the depressing action on the vaso-motor system, and hence, diminished blood-pressure. Local application to the eye causes dilatation of the pupil, through paralysis of the oculo-motor nerve; the dilatation is less prolonged than that produced by atropine.

## USE.

Gelsemine may be used in spasmodic conditions, such as asthma, whooping-cough, etc. It may be used in the treatment of headache due to eye-strain, and in certain forms of neuralgia; also in the treatment of pruritus, irritable bladder, difficult micturition, etc. Gelsemine, as a  $\frac{1}{2}$  to 1 per cent. solution, may be used to cause dilatation of the pupil; it is slow in action, however, and is inferior to homatropine. Gelsemium should never be used in asthenic conditions.

## TOXICOLOGY.

An overdose of gelsemium, or the accidental absorption of gelsemine during its administration as a mydriatic, will cause the following toxic symptoms: a sensation of languor, ptosis, a rapid and feeble pulse, a cold and moist skin, disturbed respiration, aphonia. Death, when it occurs, is due to paralysis of the respiratory centre.

*Treatment.*—Remove the unabsorbed poison if possible by means of emetics, or the syphon tube. Respiratory and cardiac stimulants, such as strychnine, atropine, external heat, ammonia, etc., are to be used as needed.

## SPIGELIA.

**Pink-root.** Maryland-pink.

The rhizome and roots of the *Spigelia marilandica* (Nat. ord., *Loganiaceæ*). Odor somewhat aromatic; taste bitter and pungent.

Habitat. United States.

Chief constituents. A volatile oil, resins, and tannic acid.

## PREPARATION.

Extractum Spigeliæ Fluidum . . . . . 3.75-7.50 Cc. ʒi-ij.

## ACTION.

Anthelmintic—a vermifuge.

## USE.

It is used to cause the expulsion of the round worm (*ascaris lumbricoides*) from the intestinal canal. The dose should be followed by a brisk purgative, such as magnesium sulphate.

## TOXICOLOGY.

Large doses act as a motor paralyzer; respiration is interfered with. A sufficiently large dose will cause sleep followed by coma, and death.

*Treatment.*—The judicious use of stimulants, such as strychnine, alcohol, ammonia, etc., is called for in the poisoning from spigelia.

## GENTIANA.

**Yellow Gentian.**

The root of the *Gentiana lutea* (Nat. ord., *Gentianeæ*). Odor peculiar, but feeble; taste intensely bitter, but not disagreeable.

Habitat. Central, and Southern Europe.

Chief constituent. Genticio-picrin.

## PREPARATIONS.

Extractum Gentianæ . . . . . 0.12-0.60 Gm. gr. ij-x.

Extractum Gentianæ Fluidum . . . . . 0.30-0.95 Cc. ℥v-xv.

Tinctura Gentianæ Composita (10 per cent.) . . . . . 1.90-3.75 Cc. ʒ½-i.

## ACTION.

Gentian has the action of a simple, bitter tonic, increasing the appetite, and the digestive function, through reflex stimulation. It has more of an irritant action than, and is therefore inferior to, calumba.

## USE.

In atonic dyspepsia; in anorexia, etc.

**CHIRATA.**

The entire dried plant of the *Swertia Chirata* (Nat. ord., *Gentianeæ*). It is inodorous and intensely bitter.

Habitat. Northern India.

Chief constituents. Ophelic acid, and chiratin.

**PREPARATIONS.**

Extractum Chiratæ Fluidum . . . . . 0.30-0.95 Cc. ℥v-xv.

Tinctura Chiratæ (10 per cent.) . . . 1.90-3.75 Cc. ʒ½-i.

**ACTION.**

That of a bitter tonic, like gentian.

**USE.**

The preparations of chirata are but little used now. It is suitable for use in the same class of cases as is gentian, viz.: in dyspepsia, anorexia, etc.

**ERIODICTYON.**

**Yerba Santa.** Mountain Balm.

The leaves of the *Eriodictyon glutinosum* (Nat. ord., *Hydrophyllaceæ*). Odor somewhat aromatic; taste balsamic, and sweetish.

Habitat. California.

Chief constituents. A volatile oil, and resin.

**PREPARATIONS.**

Extractum Eriodictyi Fluidum . . . . . 1.90-3.75 Cc. ʒ½-i.

Tinctura Eriodictyi (25 per cent.) . . . 3.75-7.50 Cc. ʒi-ij.

**ACTION.**

This has a stimulating action along the lines of elimination, viz.: upon the bronchial mucous membranes.

**USE.**

This drug has no established place as a therapeutic agent. Its preparations are used principally as vehicles to disguise the taste of disagreeable medicines, like quinine. It is considered by some to be a valuable expectorant.

**JALAPA.****Jalap.**

The tuberos root of the *Ipomœa Jalapa* (Nat. ord., *Convolvulaceæ*). Odor smoky; taste sweetish, afterward acrid.

Habitat. Mexico.

Chief constituent. The resin, convolvulin.

**Convolvulin**,  $C_{31}H_{50}O_{16}$ , occurs as an amorphous mass. Insoluble in water; soluble in alcohol.

#### PREPARATIONS.

Extractum Jalapæ . . . . .	0.18–0.30 Gm. gr. iij–v.
Resina Jalapæ . . . . .	0.12–0.24 Gm. gr. ij–iv.
Pulvis Jalapæ Compositus . . . . .	0.95–1.90 Gm. ℥xv–xxx.
Pilulæ Catharticæ Compositus . . . . .	See Colocynth.
ϕ Convolvulin . . . . .	0.06–0.18 Gm. gr. i–iij.

**Pulvis Jalapæ Compositus**=Jalap, 35 parts; cream of tartar, 65 parts.

#### ACTION.

Jalap resembles scammony in action as a hydragogue cathartic. It increases intestinal secretion; increases peristalsis; increases the secretion of bile. It is dissolved by the bile, and is not active unless bile be present.

#### USE.

Jalap is seldom used alone. The compound jalap powder may be used in certain dropsical conditions.

#### SCAMMONIUM.

##### Scammony.

A resinous exudation from the living root of the *Convolvulus Scammonia* (Nat. ord., *Convolvulacæ*).

It occurs in irregular, angular pieces or circular cakes, with a greenish-gray, or blackish color; a peculiar odor, somewhat cheese-like; and a slightly acrid taste.

Habitat. Western Asia.

Chief constituent. The resin, jalapin.

#### PREPARATIONS.

Scammonium . . . . .	0.12–0.60 Gm. gr. ij–x.
Resina Scammonii . . . . .	0.06–0.30 Gm. gr. i–v.
Extractum Colocynthidis Compositus . . . . .	See Colocynth.

#### ACTION.

A drastic, hydragogue cathartic. It acts as an irritant in the intestinal canal; it thus increases intestinal secretion; increases peristalsis; causes griping; and is an unpleasant, and an uncertain drug when used alone. It also acts as a cholagogue, increasing the secretion of bile. It is dissolved by the bile and is inactive if bile be absent from the intestinal canal.

## USE.

Because of the harsh, disagreeable, uncertain action of this drug it is seldom used even in combination with other drugs. It may be used in dropsical conditions.

**BELLADONNA FOLIA.**

**Belladonna Leaves.** Deadly Night-Shade.

The leaves of *Atropa Belladonna* (Nat. ord. *Solanaceæ*). The odor is slight; taste bitterish, and disagreeable.

Habitat. Europe, and Asia Minor.

Chief constituents. Atropine, and belladonnine.

## PREPARATIONS.

Extractum Belladonnæ Foliorum Alcoholicum . 0.01-0.02 Gm. gr.  $\frac{1}{6}$ - $\frac{1}{3}$ .

Tincturæ Belladonnæ Foliorum (15 per cent.) . 0.12-0.30 Cc. gr. ij-v.

Unguentum Belladonnæ (10 per cent. Alc.

Ext.) . . . . . For external use.

Emplastrum Belladonnæ (20 per cent. Alc.

Ext.) . . . . . For external use.

## ACTION AND USE.

That of its alkaloid atropine, *q. v.*

**BELLADONNA RADIX.**

**Belladonna Root.** Deadly Night-Shade.

The root of *Atropa Belladonna* (Nat. ord. *Solanaceæ*). This is nearly inodorous, with a sweetish, afterwards bitterish, and strongly acrid, taste.

Habitat. Europe, and Asia Minor.

Chief constituents. Atropine, and belladonnine.

## PREPARATIONS.

Extractum Belladonnæ Radicis Fluidum . 0.03-0.12 Cc.  $\mathfrak{m}$   $\frac{1}{2}$ -ij.

Linimentum Belladonnæ . . . . . For external use.

## ACTION AND USE.

That of its alkaloid atropine, *q. v.*

**ATROPINA.**  $C_{17}H_{23}NO_3$ .**Atropine.**

An alkaloid obtained from Belladonna. As it occurs in commerce it is always accompanied by a small proportion of hyoscyamine, extracted along with it, from which it cannot be readily separated.

It occurs in colorless, or white crystals, permanent in the air, odorless, having a bitter and acrid taste, and an alkaline reaction. Sparingly



soluble in water; freely soluble in alcohol. It fuses at  $104^{\circ}$ – $115^{\circ}$  C. ( $237^{\circ}$ – $239^{\circ}$  F.). Its double gold salt fuses at  $135^{\circ}$ – $137^{\circ}$  C. ( $275^{\circ}$ – $279^{\circ}$  F.).

**Atropinæ Sulphas**,  $(C_{17}H_{23}NO_3)_2H_2SO_4$ . This is a white, indistinctly crystalline powder; without odor, and having a bitter, nauseating taste. Soluble, at  $15^{\circ}$  C., in 0.4 part of water, and in 6.2 parts of alcohol.

Dose: 0.0003–0.001 Gm.; gr.  $\frac{1}{200}$ – $\frac{1}{60}$ .

#### ACTION.

Locally applied, atropine diminishes the sensibility of the part, thus acting as an anodyne. It tends to paralyze the ends of the motor nerves; at the same time there is marked excitation of the cerebral centres and of the spinal cord. The result is, that peculiar form of delirium which is characterized by a constant desire for action associated with lassitude. Atropine has no action on voluntary muscle, but involuntary muscles are depressed or paralyzed, according to the dose administered.

The pulse is quickened, through stimulation of the heart muscle, and paralysis of the inhibitory mechanism. Arterial pressure is increased, through stimulation of the vaso-motor centre, and through the increased heart's action.

Respiration is strengthened by small doses, through stimulation of the respiratory centre. Large doses paralyze the respiratory centre, and thus prove fatal.

Intestinal peristalsis is increased by small doses, through the depressing influence of atropine upon the inhibitory fibres of the splanchnic nerves. Moderate doses arrest peristaltic movements, by paralyzing the involuntary muscular fibres of the intestine.

The temperature is slightly increased by small doses; diminished by large doses.

The pupil is dilated, but from what cause is still an unsettled question. The old idea was, paralysis of the oculo-motor nerve-ending controlling the sphincter fibers of the iris, and stimulation of the sympathetic controlling the dilator muscle of the iris. The existence of dilator muscular fibers in the iris is, however, extremely doubtful. Some authorities consider the dilatation of the pupil due to elastic contraction; some think that in the sphincter muscle of the iris we have a muscular structure supplied by two nerves of opposite character, the one motor, the other inhibitory, and that dilators of the pupil act upon the latter; while others think that the vaso-motor action of atropine, in contracting the iris blood-vessels, is an important factor in producing mydriasis.

Secretion is quite generally diminished, through paralysis of the nerve filaments supplying the secretory cells of the glands. As a result of diminished secretion, there is dryness of the mouth and pharynx; a dry

condition of the skin, often accompanied by a rash; a dry and glazed condition of the pupil; and diminished, or arrested, secretion of milk.

The urine is sometimes increased in amount; this may be through the influence of atropine upon arterial pressure, and also through its influence upon the sweat glands. Large doses may cause paralysis of the bladder, and retention of urine. Under certain conditions, as in incontinence of urine, there may be an apparent diminished secretion of urine; there is not, however, diminished secretion, but the antispasmodic action of atropine upon the muscular coat of the bladder relieves the call for frequent micturition.

Elimination takes place chiefly through the kidneys.

#### USE.

Atropine, in the form of the sulphate, has a wide range of usefulness.

It is used locally in diseases of the eye, and in ophthalmic surgery, to produce dilatation of the pupil.

It (or some one of the belladonna preparations) may be used locally to relieve the pain, in the treatment of acute local inflammations; in sciatica, and other neuralgic affections.

It may be used locally as an application to the mammæ when it is necessary to check the secretion of milk.

It (or some one of the belladonna preparations) may be used in the form of a suppository, or bougie, to relieve the pain attendant upon diseases of the rectum; of the genito-urinary system; of the uterus; etc.

Internally, or hypodermatically, it may be used to check the sweating of phthisis; or to check the too abundant secretion of saliva under certain conditions.

It is one of the most reliable drug remedies in the treatment of incontinence of urine in children; to secure the best results in these cases, it must be pushed to the physiological limit.

In the treatment of spasmodic diseases, such as asthma, whooping-cough, spasmodic stricture, etc., atropine sulphate (or some preparation of belladonna) holds an important place.

In chronic constipation, atropine, or belladonna, is an excellent adjunct for use with suitable tonic laxatives, and this because of its action on the sympathetic system, thus increasing intestinal peristalsis.

It is an important anodyne, and can well be combined with morphine; the anodyne action of both of these alkaloids is then intensified, and at the same time many of the unpleasant symptoms, resulting from the use of morphine, are prevented.

#### TOXICOLOGY.

The symptoms of poisoning from belladonna, or atropine, are heat, and dryness of the mouth, and throat; difficult deglutition, giddiness,

and sometimes nausea, and vomiting. There is great mental excitement, delirium, and hallucinations which are often maniacal. The mental symptoms often take the form of wild and uncontrollable laughter. The pulse is quickened, the surface of the body becomes red and turgid, and sometimes there is a scarlet eruption. The pupils are widely dilated; death, when it occurs, is due to paralysis of respiration.

*Treatment.*—The use of emetics, or the syphon tube, to empty the stomach. Tannic acid, or charcoal should be given internally; the former forms an insoluble tannate; the latter absorbs the alkaloid, and thus delays action. These agents are only temporary antidotes, and should be followed by an emetic or the use of the syphon tube. Physostigmine and morphine are physiological antidotes.



### Homatropine.

This is obtained from tropic acid and tropin, two derivatives of atropine. It is a by-product in the preparation of atropine. It occurs in transparent, colorless prisms, not easily soluble in water, although it is hygroscopic, and very deliquescent.

Dose, 0.0003–0.001 Gm., gr.  $\frac{1}{200}$ – $\frac{1}{60}$ .

#### ACTION.

Homatropine has the general, but less pronounced, action of atropine.

#### USE.

Its use is confined to ophthalmic practice where, as a mydriatic, it is a superior agent. It is as a 1 to 2 per cent. solution, or as gelatin discs containing about 0.0005 to 0.001 Gm (gr.  $\frac{1}{200}$ – $\frac{1}{60}$ ), that it is here used. The hydrobromate is the salt preferred.

### STRAMONII FOLIA.

**Leaves of Stramonium.** Thorn Apple. Jamestown Weed.

The leaves of *Datura Stramonium* (Nat. ord. *Solanaceæ*). These are nearly inodorous, and have an unpleasant, bitter and nauseous taste.

*Habitat.* North America, Europe, and Asia.

*Chief constituents.* Daturine, which is probably a mixture of hyoscyamine, and atropine.

#### ACTION.

Stramonium closely resembles belladonna in its physiological action, and may be looked upon as a poor substitute for the same.

#### USE.

Stramonium need be used but little therapeutically, as it can be completely, and satisfactorily, displaced by belladonna.

## STRAMONII SEMEN.

**Seeds of Stramonium.** Thorn apple. Jamestown Weed.

The seeds of *Datura Stramonium* (Nat. ord. *Solanaceæ*). These have an unpleasant odor when bruised, and an oily, bitter taste.

## PREPARATIONS.

Extractum Stramonii Seminis . . . . . 0.01–0.03 Gm. gr.  $\frac{1}{6}$ – $\frac{1}{2}$ .

Extractum Stramonii Seminis Fluidum . . . 0.06–0.12 Cc. ℥ i–ij.

Tinctura Stramonii Seminis (15 per cent.) . 0.30–0.95 Cc. ℥ v–xv.

Unguentum Stramonii (10 per cent.) . . . For external use.

## ACTION AND USE.

The same as that for stramonium leaves.

## HYOSCYAMUS.

**Henbane.**

The leaves and flowering tops of *Hyoscyamus Niger* (Nat. ord., *Solanaceæ*), collected from plants of the second year's growth. These have a heavy odor, with a bitter, and somewhat acrid taste.

Habitat. Europe.

Chief constituents. Hyoscyamine,—isomeric with atropine,—and Hyoscine.

## PREPARATIONS.

Extractum Hyoscyami . . . . . 0.03–0.12 Gm. gr.  $\frac{1}{2}$ –ij.

Extractum Hyoscyami Fluidum . . . 0.30–0.95 Cc. ℥ v–xv.

Tinctura Hyoscyami (15 per cent.) . . 1.90–3.75 Cc.  $3\frac{1}{2}$ –j.

## ACTION.

*Hyoscyamus* resembles belladonna in its general action. It has, however, a more marked hypnotic effect, and a less marked anodyne, antispasmodic, and mydriatic action. (Compare with hyoscine hydrobromate.)

## USE.

It may be used much after the manner of belladonna. As an hypnotic it may sometimes be used as a substitute for opium.

**HYOSCINÆ HYDROBROMAS.**  $C_{17}H_{21}NO_4HBr + 3H_2O$ .

**Hyoscine Hydrobromate.**

This is the hydrobromate of the alkaloid hyoscine. It is in colorless, transparent crystals; odorless, having an acrid, slightly bitter taste, and a neutral reaction. Permanent in the air. Soluble, at 15° C., in 1.9 parts of water, and in 13 parts of alcohol.

Dose: 0.0005–0.001 Gm. gr.  $\frac{1}{120}$ – $\frac{1}{60}$ .

## ACTION.

Hyoscine has more pronounced sedative and hypnotic action than has atropine or hyoscyamine. At times, instead of producing sleep, it will cause wild delirium, resembling that produced by atropine.

## USE.

Hyoscine is a useful hypnotic in the treatment of some forms of acute mania.

## TOXICOLOGY.

Untoward symptoms are common during the use of this drug. In a general way it may be stated that poisoning caused by hyoscine resembles that of atropine. The treatment is the same.

**HYOSCYAMINÆ HYDROBROMAS.**  $C_{17}H_{23}NO_3Br$ .**Hyoscyamine Hydrobromate.**

This is the hydrobromate of the alkaloid hyoscyamine, which is isomeric with atropine. It is in yellowish-white, amorphous, resin-like masses, or prismatic crystals, having a tobacco-like odor, an acrid, nauseous and bitter taste, and a neutral reaction. Deliquescent on exposure to air. Soluble, at  $15^{\circ}C$ ., in about 0.3 part of water, and in 2 parts of alcohol.

Dose: 0.0005–0.001 Gm. gr.  $\frac{1}{120}$ – $\frac{1}{60}$ .

**HYOSCYAMINÆ SULPHAS.**  $(C_{17}H_{23}NO_3)_2H_2SO_4$ .**Hyoscyamine Sulphate.**

This is the neutral sulphate of the alkaloid hyoscyamine. It is in white, indistinct crystals, or as a white powder, odorless, having a bitter, acrid taste, and a neutral reaction. Deliquescent in damp air. Soluble, at  $15^{\circ}C$ ., in 0.5 part of water, and in 2.5 parts of alcohol.

Dose: 0.0005–0.001 Gm. gr.  $\frac{1}{120}$ – $\frac{1}{60}$ .

## ACTION.

The salts of hyoscyamine have an action resembling that of both atropine and hyoscine.

## USE.

Hyoscyamine may be used as an anodyne instead of atropine; as an hypnotic instead of hyoscine. It has no advantages, however, over these agents for which it is substituted.

Φ **DUBOISIA.**

The leaves of *Duboisia Myoporoides* (Nat. ord., *Solanaceæ*). These are inodorous, and have a bitter taste.

Habitat. Australia.



Chief constituent. Duboisine (a mixture of atropine and hyoscyamine).

#### ACTION.

That of atropine and hyoscyamine. As a mydriatic it is more prompt, energetic, and of shorter duration than is atropine.

#### USE.

Duboisine—the sulphate, or salicylate—may be used in ophthalmic practice, an aqueous solution in the proportion of 1 in 250 being about the proper strength. It is more apt to produce toxic symptoms than is atropine.

#### TABACUM.

##### Tobacco.

The commercial dried leaves of the *Nicotiana Tabacum* (Nat. ord., *Solanaceæ*). These have a heavy, peculiar odor; a nauseous, bitter, and acrid taste.

Chief constituents. Nicotin, nicotianin.

#### ACTION.

Diuretic, sedative, emetic, narcotic.

#### USE.

Therapeutically, tobacco is rarely used.

#### Φ PICH1.

##### Fabiana.

The leaves of the *Fabiana imbricata* (Nat. ord., *Solanaceæ*).

Habitat. South America.

Chief constituents. A resin, and a volatile oil.

#### PREPARATIONS.

Extractum Pichi . . . . . 0.12–0.60 Gm. gr. ij–x.

Extractum Pichi Fluidum . . . . . 0.60–1.90 Cc. ℥x–xxx.

#### ACTION.

It resembles the terebinthinates in action. It stimulates secretion along the lines of elimination. It is probably antiseptic. It is diuretic, expectorant, and tonic.

#### USE.

It may be used in cystitis, in chronic nephritis, in gonorrhœa, etc.

#### DULCAMARA.

##### Bitter-sweet.

The young branches of the *Solanum Dulcamara* (Nat. ord., *Solanaceæ*). Odor slight; taste at first bitter, afterwards sweet.

Chief constituents. Resin, solanin, and dulcamarin.

## PREPARATION.

Extractum Dulcamaræ Fluidum . . . . . 1.90-3.75 Cc.  $\mathfrak{z}\frac{1}{2}$ -i.

## ACTION.

Dulcamara is supposed to have an alterative action.

## USE.

It is an unimportant therapeutic agent. It has been used in certain chronic skin diseases, in rheumatism, etc.

## CAPSICUM.

**Cayenne Pepper.** Red Pepper. Bird Pepper. Chili Pepper.

The fruit of *Capsicum fastigiatum* (Nat. ord., *Solanaceæ*). It has a peculiar odor, and intensely hot taste.

Habitat. South America.

Chief constituent. A volatile substance, and capsaicin.

## PREPARATIONS.

Emplastrum Capsici . . . . . For external use.

Extractum Capsici Fluidum . . . . . 0.03-0.06 Cc.  $\mathfrak{m}\frac{1}{2}$ -i.

Oleoresina Capsici . . . . . 0.01-0.03 Cc.  $\mathfrak{m}\frac{1}{6}$ - $\frac{1}{2}$ .

Tinctura Capsici (5 per cent.) . . . . . 0.30-0.95 Cc.  $\mathfrak{m}_{v-xxx}$ .

## ACTION.

Externally capsicum acts as an irritant, causing redness of the part, and producing dilatation of the superficial vessels.

Internally it acts as a stimulant, both to gastric and intestinal secretion, and in moderate doses may aid digestion. Large continued doses cause gastric disturbance as the result of constant irritation.

## USE.

Locally, capsicum may be used as a counter-irritant; as a gargle, or local application, it may be used in simple tonsillitis, pharyngitis, etc.

Internally, it may be used in atonic dyspepsia due to debility, chronic alcoholism, etc. It may be used to control the craving for alcoholic stimulants. It may be used in chronic nephritis.

## DIGITALIS.

**Fox-glove.**

The leaves of the *Digitalis purpurea* (Nat. ord., *Scrophularinæ*), collected from plants of the second year's growth. Odor slight, somewhat tea-like; taste bitter, nauseous.

Habitat. Europe.

Chief constituents. Digitoxin, Digitalin, Digitalein, Digitonin.

**Digitoxin**,  $C_{21}H_{32}O_7$ , is the most poisonous of the principles extracted from digitalis. It occurs in white crystals, with a very bitter taste, insoluble in water. Sparingly soluble in alcohol.

**Digitalin**,  $C_5H_8O_2$ , occurs in soft, colorless, uncrystallizable granules. Sparingly soluble in water; freely soluble in alcohol.

**Digitalein**,  $C_{25}H_{40}O_{25}$ , occurs as a pale yellow, amorphous powder. Soluble in water, and in alcohol.

**Digitonin**,  $C_{31}H_{52}O_{17}$ , is a substance allied to saponin. Freely soluble in water.

#### PREPARATIONS.

Extractum Digitalis . . . . . 0.01-0.03 Gm. gr.  $\frac{1}{6}$ - $\frac{1}{2}$ .

Extractum Digitalis Fluidum . . . . 0.06-0.12 Cc. ℥i-ij.

Tinctura Digitalis (15 per cent.) . . 0.30-0.60 Cc. ℥v-x.

Infusum Digitalis (1.5 per cent.) . . 3.75-7.50 Cc. ℥i-ij.

#### ACTION.

The chemistry of digitalis is not fully settled yet. The commercial "digitalin" is not uniform in its constituents and is not the same as the glucoside digitalin, but is rather a mixture of the active principles of digitalis. The active principles of digitalis are not equally soluble in alcohol and in water, and we might therefore expect a difference in action between the tincture, and the infusion; a difference does exist. The chief action of digitalis is upon the circulation. It is a cardiac tonic and a cardiac stimulant; it also increases arterial tension. In medicinal doses it slows the pulse, and at the same time increases its force. The slow pulse is due to stimulation of the pneumogastric centre, and of the peripheral nerve endings in the heart; diastole is prolonged. The increased force is due to stimulation of the vaso-motor system; systole is strengthened. So long as these two forces are equally balanced the drug is producing its best results. In poisoning the heart's action is rapid and irregular, and may stop in systole, or in diastole. Increased blood-pressure is due to the increased heart's action, and also to stimulation of the vaso-motor system, causing a contraction of the arteries and arterioles—increased arterial tension. Digitalis has no direct effect upon the kidneys; it does not increase the secretion of urine; there is, however, increased elimination of urine, and this is due to the increased blood-pressure, improved general circulation, and diminished congestion of the kidneys. This action is best seen in cases of cardiac disease. Large doses may cause diminution, or even suppression of the urine; this occurs when the blood-pressure reaches its maximum. Digitalis has no marked action in medicinal doses upon the nervous system, the respiration, or the normal temperature.

Certain unfortunate properties of this drug diminish its value. It may

cause irritation of the gastric mucous membrane, giving rise to nausea and vomiting. It counteracts its good effect on the heart to a certain degree by the increased arterial tension which it produces. At times it gives rise suddenly to symptoms of acute poisoning, through its cumulative action, and this is probably due to the impaired functional activity of the kidneys.

Infusion of digitalis contains more digitonin, less digitalin and digitalin than does the tincture; it also contains no digitoxin. As digitonin has an action antagonistic to the other active principles, both on the heart and on the arteries, and as digitoxin, the most poisonous of the active principles, is absent, the infusion may be given in larger doses, relatively, than the tincture.

#### USE.

Digitalis may be used in all forms of cardiac valvular disease where compensatory hypertrophy is not sufficient to overcome the leakage. It is least useful in aortic regurgitation because, with the prolonged diastole, there may be over-distention of the left ventricle.

In palpitation, digitalis, by its sedative action upon the heart, may be of marked benefit; as a rule, however, other therapeutic agents are also needed.

For its diuretic action digitalis—by preference the infusion—may be used in certain dropsical conditions, due to disease of the heart, or of the kidneys. Such adjuncts as squills, mercury, etc., will often increase the efficiency of digitalis when the dropsical condition is due to disease of the kidneys.

In times past digitalis had a prominent place as a “cardiac stimulant” in the treatment of certain exhaustive diseases, such as typhoid fever, pneumonia, etc., but other, and more deserving cardiac stimulants, such as strychnine, have quite generally displaced it.

Digitalis is contra-indicated in fatty degeneration, or in simple hypertrophy of the heart, or in atheroma of the vessels.

#### TOXICOLOGY.

This generally occurs as the result of continued dosing. The symptoms are, an irregular, rapid, feeble, and sometimes almost imperceptible pulse, with sometimes nausea, vomiting, and profuse sweating.

*Treatment.*—The recumbent posture must be insisted upon. If necessary the stomach tube may be used. Tannic acid may be administered as a chemical antidote. Aconite, and also the nitrites may be used as physiological antidotes.

Ammonia, alcohol, and the application of artificial heat especially over the abdomen, are also to be used.

## LEPTANDRA.

**Culvers-root.**

The rhizome and roots of the *Veronica virginica* (Nat. ord., *Scrophularineæ*). This is inodorous; taste bitter, and acrid.

Habitat. United States.

Chief constituent. Leptandrin.

## PREPARATIONS.

Extractum Leptandræ . . . . . 0.06–0.60 Gm. gr. i–x.

Extractum Leptandræ Fluidum . . . . . 0.30–0.95 Cc. ℥v–xv.

## ACTION.

That of a cholagogue and cathartic.

## USE.

Leptandra may be used in some forms of intestinal indigestion. It is an unimportant therapeutic agent.

## OLEUM SESAMI.

**Oil of Sesamum.** Benné oil. Teal oil.

This is a fixed oil expressed from the seeds of *Sesamum indicum* (Nat. ord., *Pedaliaceæ*). It should be kept in well-stoppered bottles.

It occurs as a yellowish, or yellow, oily liquid; inodorous, or nearly so, and having a bland, nut-like taste. Sp. gr.: 0.919–0.923 at 15° C.

## ACTION.

Bland and protectant, like olive oil. It is less agreeable, and less digestible, than is olive oil.

## USE.

The same as that of olive oil, locally.

## MENTHA PIPERITA.

**Peppermint.**

The leaves and tops of *Mentha Piperita* (Nat. ord., *Labiatae*).

Odor aromatic; taste pungent, and cooling.

Habitat. Asia, Europe, and North America.

Chief constituents. A volatile oil (terpene and menthol), and tannic acid.

## ACTION AND USE.

See Oleum Menthæ Piperitæ.



## OLEUM MENTHÆ PIPERITÆ.

## Oil of Peppermint.

A volatile oil distilled from peppermint. It should be kept in well-stoppered bottles, in a cool place.

It occurs as a colorless, or yellowish, or greenish-yellow liquid, having the characteristic, strong odor of peppermint, and a strongly aromatic, pungent taste, followed by a sensation of cold when air is drawn into the mouth. Sp. gr. : 0.900 to 0.920, at 15° C.

## PREPARATIONS.

Oleum Menthæ Piperitæ . . . . .	0.06-0.30 Cc.	℥i-v.
Aqua Menthæ Piperitæ ( $\frac{1}{2}$ per cent.) . .	3.75-30.00 Cc.	ʒi-ʒi.
Spiritus Menthæ Piperitæ (10 per cent.).	0.30-1.90 Cc.	℥v-xxx.
Trochisci Menthæ Piperitæ . . . . .	1 = 0.01 Cc.	℥ $\frac{1}{6}$ .

## ACTION.

Carminative, analgesic, and stimulant.

## USE.

Pharmaceutically, the oil may be used as a flavoring agent.

Therapeutically, the oil may be used locally in the treatment of neuralgia, toothache, etc.

Internally, it may be used in flatulence, colic, etc.

MENTHOL.  $C_{10}H_{19}OH$ .

## Peppermint Camphor.

A stearoptene (having the character of a secondary alcohol) obtained from the official oil of peppermint. It should be kept in well-stoppered bottles, in a cool place.

It occurs in colorless crystals, having a strong and pure odor of peppermint, a warm, aromatic taste, followed by a sensation of cold when air is drawn into the mouth, and a neutral reaction. Volatile. Sparingly soluble in water; soluble in alcohol, ether, etc. When triturated with about an equal weight of camphor, thymol, or chloral hydrate, the mixture becomes liquid.

Dose : 0.03-0.12 Gm. gr.  $\frac{1}{2}$ -ij.

## ACTION.

Menthol acts as a local anæsthetic by paralyzing the ends of the sensory nerves. It causes contraction of the blood-vessels when applied locally, through stimulation of the vaso-motor system, and this is not followed by the excessive dilatation produced by cocaine when used for a

similar purpose. It is also an active antiseptic. Through its anæsthetic and antiseptic action it may have a sedative action on the gastric mucous membrane. It may also arrest fermentation.

#### USE.

Menthol may be used by inhalation to relieve congestion of the mucous membrane lining the upper air-passages. An aqueous or oily solution (1 to 2 per cent.) may be used, by means of spray or applicator, for the same purpose. A 20 to 50 per cent. oily solution may be applied to a part to diminish congestion, or to produce a local anæsthetic or sedative action. In the form of a crayon or an oily solution, it may be applied to the skin to produce its local anæsthetic action, as in neuralgia, headache, etc.

As an antipruritic, a 1 to 5 per cent. solution, or ointment, may be used in the treatment of certain skin diseases.

A 50 per cent. ethereal solution may be applied over superficial inflammations—boils, etc.,—with the hope of controlling the inflammatory process.

Internally menthol may be used to control vomiting, to relieve the pain of gastralgia, etc.

#### MENTHA VIRIDIS.

##### Spearmint.

The leaves and tops of *Mentha viridis* (Nat. ord., *Labiatae*). Odor aromatic; taste pungent.

Habitat. Europe, and North America.

Chief constituent. A volatile oil.

#### ACTION AND USE.

See Oleum Menthæ Viridis.

#### OLEUM MENTHÆ VIRIDIS.

##### Oil of Spearmint.

A volatile oil distilled from spearmint. It should be kept in well-stoppered bottles, in a cool place, protected from light.

It occurs as a colorless, yellowish, or greenish-yellow liquid, having the characteristic, strong odor of spearmint, and a hot, aromatic taste. Sp. gr., 0.930 to 0.940 at 15° C.

#### PREPARATIONS.

Oleum Menthæ Viridis . . . . .	0.06– 0.30 Cc. M <sub>i</sub> –v.
Aqua Menthæ Viridis ( $\frac{1}{2}$ per cent.) . . .	3.75–30.00 Cc. ʒi–ʒi.
Spiritus Menthæ Viridis (10 per cent.) . .	0.30– 1.90 Cc. M <sub>v</sub> –xxx.

## ACTION.

That of the oil of peppermint, but milder; stimulant, and carminative.

## USE.

It may be used in flatulence, colic, etc.

## HEDEOMA.

**Pennyroyal.**

The leaves and tops of *Hedeoma pulegioides* (Nat. ord., *Labiatae*). The odor is strong, and mint-like; the taste warm, and pungent.

Habitat. North America.

Chief constituent. A volatile oil.

## ACTION AND USE.

The same as that of *oleum hedeomæ*, *q. v.*

## OLEUM HEDEOMÆ.

**Oil of Pennyroyal.**

A volatile oil distilled from Hedeoma. It should be kept in well-stoppered bottles, in a cool place, protected from light

It occurs as a pale yellowish, limpid liquid, having a characteristic, pungent, mint-like odor and taste. Sp. gr.: 0.930 to 0.940, at 15° C.

Dose: 0.06–0.30 Cc. *Mi-v.*

## ACTION.

That of a carminative, and stimulant.

## USE.

Like other remedies of its class it may be used to relieve flatulence, colic, etc.

## MARRUBIUM.

**Horehound.**

The leaves and tops of *Marrubium vulgare* (Nat. ord., *Labiatae*). These have a strong, peculiar and aromatic odor, and an aromatic bitter taste.

Habitat. Asia, and Europe.

Chief constituents. A volatile oil, tannic acid, a bitter principle, (marrubiin).

Dose: 0.60–3.75 Gm. gr. x–ʒi (in infusion).

## ACTION.

Carminative, stimulant, expectorant, diaphoretic, diuretic.

## USE.

This is an unimportant therapeutic agent. It may be used in dyspepsia, in chronic bronchitis, etc.

**MELISSA.****Balm.**

The leaves and tops of *Melissa officinalis* (Nat. ord. *Labiatae*). These have a fragrant, aromatic odor; a somewhat astringent and bitterish taste.

Habitat. Western Asia, and Southern Europe.

Chief constituent. A volatile oil.

Dose: 3.75–7.50 Gm.; ʒi–ij (in infusion).

**ACTION.**

Carminative, stimulant, diaphoretic.

**USE.**

This is an unimportant therapeutic agent and is but little used.

**SCUTELLARIA.****Skull Cap.**

The herb of *Scutellaria lateriflora* (Nat. ord. *Labiatae*). It has a slight odor and a bitterish taste.

Habitat. North America.

Chief constituents. A volatile oil, a bitter principle, and tannic acid.

**PREPARATION.**

Extractum Scutellariæ Fluidum . . . . 1.90–3.75 Cc. ʒ½–i.

**ACTION.**

Unimportant. Possibly anti-spasmodic and tonic.

**USE.**

This is an unimportant official herb, and is seldom used.

**SALVIA.****Sage.**

The leaves of the *Salvia officinalis* (Nat. ord. *Labiatae*). These have an aromatic odor; an aromatic, bitterish, and somewhat astringent taste.

Habitat. Southern Europe.

Chief constituents. A volatile oil, and tannic acid.

Dose: 1.90–3.75 Gm.; ʒ½–i (in infusion).

**ACTION.**

Carminative, stimulant, astringent.

**USE.**

This is an unimportant therapeutic agent.

## OLEUM ROSMARINI.

## Oil of Rosemary.

A volatile oil distilled from the leaves of *Rosmarinus officinalis* (Nat. ord. *Labiatae*). It should be kept in well-stoppered bottles, in a cool place, protected from light. It occurs as a colorless or pale yellow, limpid liquid, having the characteristic, pungent odor of rosemary, and a warm, somewhat camphoraceous taste. Sp. gr. : 0.895 to 0.915, at 15° C.

## PREPARATIONS.

Oleum Rosmarini . . . . .	0.06-0.30 Cc. ℥i-v.
Tinctura Lavendulae Composita ( $\frac{2}{10}$ per cent.) . . . . .	1.90-3.75 Cc. 3½-i.
Linimentum Saponis (1 per cent.) . . .	For external use.

## ACTION.

Carminative, stimulant.

## USE.

This is another unimportant therapeutic agent, and is only used in combination with other drugs.

## OLEUM THYMI.

## Oil of Thyme.

A volatile oil distilled from the leaves and flowering tops of *Thymus vulgaris* (Nat. ord. *Labiatae*). It should be kept in well-stoppered bottles in a cool place, protected from light. It occurs as a yellowish, or yellowish-red liquid, having a strong odor of thyme, and an aromatic, pungent, and afterwards cooling taste. Sp. gr. : 0.900 to 0.930, at 15° C.

Dose: 0.06-0.30 Cc. ℥ i-v.

## ACTION.

Carminative, stimulant, antiseptic.

## USE.

This is an unimportant therapeutic agent.

THYMOL.  $C_{10}H_{14}O$ .

A phenol occurring in the volatile oils of *Thymus vulgaris* (Nat. ord. *Labiatae*) and *Carum ajowan* (Nat. ord. *Umbelliferae*).

It should be kept in well-stoppered bottles.

It occurs in large, colorless crystals, having an aromatic, thyme-like odor, a pungent, aromatic taste. Sp. gr. : as a solid, 1.069, at 15° C., but when liquefied by fusion it is lighter than water. It melts at 50° to 51° C. When triturated with about equal quantities of camphor, men-



thol, or chloral, it liquefies. Soluble in 1200 parts of water, at 15° C., and in less than its own weight of alcohol, ether, or chloroform.

Dose: 0.03–0.12 Gm. gr.  $\frac{1}{2}$ –ij.

#### ACTION.

Thymol has the action of a local irritant and anæsthetic, resembling carbolic acid but with less marked effect. As an antiseptic it is more permanent than carbolic acid. Its paralyzing action on the nerve centres is not preceded by a stage of excitement, as is carbolic acid. During elimination by the bronchial mucous membrane and by the kidneys it may cause irritation of these parts.

#### USE.

Thymol, as an antiseptic, may be used as a substitute for carbolic acid locally, in solutions varying from 1 to 3000 to 1 in 1000. In certain skin diseases it may be used as a 1 to 5 per cent. ointment.

Internally, it may be used as an intestinal antiseptic in the treatment of certain forms of diarrhœa, in typhoid fever, etc., 0.12 Gm. (gr. ij) may be given in pill form every six hours, or oftener.

### OLEUM LAVANDULÆ FLORUM.

#### Oil of Lavender Flowers.

A volatile oil distilled from the fresh flowers of *Lavandula officinalis* (Nat. ord. *Labiata*). It should be kept in well-stoppered bottles in a cool place, protected from light.

It occurs as a colorless or yellowish liquid, having the fragrant odor of lavender flowers, and a pungent, bitterish taste. Sp. gr. 0.885 to 0.897, at 15° C.

#### PREPARATIONS.

Oleum Lavandulæ Florum . . . . .	0.06–0.30 Cc. ℥ i–v.
Spiritus Lavandulæ (5 per cent.) . . . . .	0.30–0.95 ℥ v–xv.
Tinctura Lavandulæ Compositæ (1% per cent.)	1.90–3.75 Cc. 3½–i.

#### ACTION.

Carminative, stimulant.

#### USE.

An unimportant therapeutic agent.

### CHENOPODIUM.

#### American Worm Seed.

The fruit of *Chenopodium ambrosioides* (Nat. ord. *Chenopodiaceæ*). Odor peculiar, strong, terebinthinate; taste pungent, and bitter.

Habitat. United States.

Chief constituent. A volatile oil.

Dose: 0.30–1.90 Gm. gr. v–xxx.

#### ACTION.

Anthelmintic.

#### USE.

Chenopodium may be used to cause the expulsion of the *ascaris lumbricoides* (round worm) from the intestinal canal.

### OLEUM CHENOPODII.

#### Oil of American Worm Seed.

A volatile oil distilled from chenopodium. It should be kept in well-stoppered bottles, in a cool place.

It occurs as a thin, colorless or yellowish liquid, having a peculiar, penetrating, somewhat camphoraceous odor, and a pungent, bitterish taste. Sp. gr. 0.970, at 15° C.

Dose: 0.30–0.60 Cc. ℥v–x.

#### ACTION.

Anthelmintic.

#### USE.

It may be used to cause the expulsion of the *ascaris lumbricoides* (round worm) from the intestinal canal.

### PHYTOLACCÆ FRUCTUS.

#### Phytolacca Fruit. Poke Berry.

The fruit of *Phytolacca decandra* (Nat. ord., *Phytolaccaceæ*). It is inodorous, and has a sweet, slightly acid taste.

Habitat. North America.

Chief constituents. Resin, a volatile oil, and tannic acid.

Dose: 0.30–0.60 Gm. gr. v–x. (in infusion).

#### ACTION.

Alterative, emetic.

#### USE.

An unimportant therapeutic agent. It may be used in chronic rheumatism, in tertiary syphilis, etc.

### PHYTOLACCÆ RADIX.

#### Phytolacca Root. Poke Root.

The root of *Phytolacca decandra* (Nat. ord., *Phytolaccaceæ*). It has the general characteristic action and use of *phytolacca fructus*, *q. v.*

#### PREPARATION.

Extractum Phytolaccae Radicis Fluidum . 0.30–1.90 Cc. ℥v–xxx.

## RHEUM.

**Rhubarb.**

The root of the *Rheum officinale* (Nat. ord., *Polygonaceæ*). Odor somewhat peculiar and aromatic; taste, bitter, and somewhat astringent.

Habitat. China, etc.

Chief constituents. Phaoretin, rheotanic acid, chrysophanic acid, chrysophan, emodin, etc.

## PREPARATIONS.

Rheum (powdered) . . . . . 0.30-1.90 Gm. gr. v-xxx.

Pilulæ Rhei . . . . . 1 = 0.20 Gm. gr. iij.

Pilulæ Rhei Compositæ.

Pulvis Rhei Compositus . . . . . 1.90-3.75 Gm.  $3\frac{1}{2}$ -i.

Extractum Rhei . . . . . 0.30-0.60 Gm. gr. v-x.

Extractum Rhei Fluidum . . . . . 0.30-1.90 Cc. ℥x-xxx.

Tinctura Rhei (10 per cent.) . . . . . 3.75-7.50 Cc.  $3i$ -ij.

Tinctura Rhei Aromatica (20 per cent.) . 1.90-3.75 Cc.  $3\frac{1}{2}$ -i.

Tinctura Rhei Dulcis (10 per cent.) . . 3.75-7.50 Cc.  $3i$ -ij.

Syrupus Rhei (10 per cent. Fd. Ext.) . . 1.90-7.50 Cc.  $3\frac{1}{2}$ -ij.

Syrupus Rhei Aromaticus (15 per cent.

aromat. tinct.) . . . . . 1.90-7.50 Cc.  $3\frac{1}{2}$ -ij.

Mistura Rhei et Sodæ. . . . . 1.90-7.50 Cc.  $3\frac{1}{2}$ -ij.

**Pilulæ Rhei Compositæ.** Each pill contains of rhubarb 0.13, purified aloes 0.10, and myrrh 0.06 Gm.

**Pulvis Rhei Compositus** contains rhubarb 25, magnesia 65, and ginger 10 parts.

**Tinctura Rhei Aromatica** contains rhubarb 20 with aromatics 10 parts in 100.

**Tinctura Rhei Dulcis** contains rhubarb 10, liquorice 4, with aromatics 5 parts in 100.

**Mistura Rhei et Sodæ** contains sodium bicarbonate 3.5, fluid extract of rhubarb 1.5, and fluid extract of ipecac 33 parts in 100.

## ACTION.

Rhubarb in small doses acts as a tonic, increasing secretion throughout the alimentary canal. The secretion of bile is also increased. Larger doses are purgative and astringent. The purgative action is due to increased secretion in part, but chiefly to increased peristalsis; it may cause some griping; the stool produced is pultaceous rather than watery. The astringent action follows the purgative action and in no way interferes with the latter. The coloring principle of rhubarb is absorbed and may be detected during elimination in the urine and in the sweat.

## USE.

Rhubarb may be used as a simple laxative. It may also be used in the treatment of diarrhœa, with the advantage of an astringent action following the laxative effect.

## RUMEX.

**Yellow-dock.**

The root of the *Rumex crispus* and other species of *Rumex* (Nat. ord., *Polygonaceæ*). Odor slight, peculiar; taste bitter, astringent.

Habitat. Europe.

Chief constituents. Tannic acid, chrysophanic acid, and a bitter principle.

## PREPARATION.

Extractum Rumicis Fluidum . . . . . 1.90-3.75 Cc.  $3\frac{1}{2}$ -i.

## ACTION.

Tonic, astringent, and alterative.

## USE.

An unimportant therapeutic agent. It may be used in certain chronic skin diseases.

## SERPENTARIA.

**Virginia Snake-root.**

The rhizome and roots of the *Aristolochia Serpentina* and *Aristolochia reticulata* (Nat. ord., *Aristolochiaceæ*). The odor is aromatic, camphoraceous; taste warm, bitter, and camphoraceous.

Habitat. United States.

Chief constituents. Resin, a volatile oil, and tannic acid.

## PREPARATIONS.

Extractum Serpentariæ Fluidum . . . . . 0.30-1.90 Cc. ℥v-xxx.

Tinctura Serpentariæ (10 per cent.) . . . . . 1.90-3.75 Cc.  $3\frac{1}{2}$ -i.

Tinctura Cinchonæ Composita (2 per cent.) . 3.75-7.50 Cc.  $3i$ -ij.

## ACTION.

An aromatic tonic, and stimulant; diaphoretic, and diuretic.

## USE.

An unimportant therapeutic agent.

## CUBEBA.

**Cubeb.**

The unripe fruit of *Piper Cubeba* (Nat. ord., *Piperaceæ*). This has a strong, spicy odor; taste aromatic, pungent.

Habitat. East Indies.

Chief constituents. A volatile oil, a resin, and cubebin.

**Cubebin**,  $C_{10}H_{10}O_3$ , crystallizes in small scales, or needles. It is odorless, and has a bitter taste. Soluble in boiling alcohol, but deposits on cooling.

**Cubebic acid**,  $C_{13}H_{14}O_7$ , is obtained from the resin. It occurs as a white, wax-like substance, readily soluble in alcohol and ether.

#### PREPARATIONS.

Extractum Cubebæ Fluidum . . . . .	0.60–1.90 Cc.	M <sub>x</sub> –xxx.
Tinctura Cubebæ (20 per cent.) . . . . .	1.90–3.75 Cc.	3½–i.
Oleoresina Cubebæ . . . . .	0.30–0.95 Cc.	M <sub>v</sub> –xv.
Trochisci Cubebæ = oleoresin . . . . .	0.04 Cc.	M <sub>3</sub> ⁄₃.
Oleum Cubebæ . . . . .	0.30–0.60 Cc.	M <sub>v</sub> –x.
∅ Cubebic Acid . . . . .	0.30–0.60 Gm.	gr. v–x.

#### ACTION.

Cubeb has a stimulating action both at the seat of application and along the lines of elimination. It is also antiseptic.

Elimination takes place chiefly through the kidneys and the bronchial mucous membrane. A portion of the unabsorbed drug may be excreted by the bowels.

An over-dose may cause marked irritation throughout the alimentary canal, and also along the genito-urinary tract. An acute inflammatory condition of parts through which the elimination of cubeb may occur is a hindrance to its therapeutic use.

#### USE.

Cubeb may be used in the powdered form, by means of an insufflator, or by the inhalation of smoke from burning cubeb, in the treatment of chronic nasal catarrh; for such use it is simply palliative, and hence unsatisfactory.

Internally, cubeb may be used in subacute or chronic bronchitis, laryngitis, etc. It may also be used in the subacute or chronic stage of gonorrhœa, in chronic inflammations of the bladder, etc.

#### OLEUM CUBEBÆ.

##### Oil of Cubebs.

A volatile oil distilled from cubeb. It should be kept in well-stoppered bottles, in a cool place.

It occurs as a colorless, pale-greenish, or yellowish liquid, having the characteristic odor of cubeb, and a warm, camphoraceous, aromatic taste. Sp. gr.: about 0.920 at 15° C.

Dose: 0.30–0.60 Cc. M<sub>v</sub>–x.



## ACTION AND USE.

The same as that of cubeb, *q. v.*

## PIPER.

**Black pepper.**

The unripe fruit of *Piper nigrum* (Nat. ord., *Piperaceæ*). This has an aromatic odor; taste pungent, and spicy.

Habitat. India.

Chief constituents. A volatile oil, resin, and piperin.

## PREPARATIONS.

Oleoresina Piperis . . . . .	0.01-0.06 Cc.	m ⅙-i.
Piperinum . . . . .	0.03-0.30 Gm.	gr. ⅓-v.

## ACTION.

Black pepper has the action of a carminative, local stimulant, and irritant. The action is largely due to the volatile oil which it contains.

## USE.

Pepper may be used as a counter-irritant. Its therapeutic application is very limited.

PIPERINUM.  $C_{17}H_{19}NO_3$ .**Piperin.**

This is a neutral principle obtained from pepper, and obtainable also from other plants of the Nat. ord., *Piperaceæ*.

It occurs as colorless, or pale-yellowish, shining, prismatic crystals; odorless, and almost tasteless when first put in the mouth, but on prolonged contact producing a sharp, and biting sensation. Almost insoluble in water; soluble, at 15° C., in 30 parts of alcohol.

Dose: 0.03-0.30 Gm. gr. ⅓-v.

## ACTION AND USE.

That of piper, *q. v.*

## MATICO.

The leaves of the *Piper Angustifolium* (Nat. ord., *Piperaceæ*). The odor is slight; taste warm, aromatic, and bitter.

Habitat. Tropical America.

Chief constituents. A volatile oil, tannic acid, and resin.

## PREPARATIONS.

Extractum Matico Fluidum . . . . .	1.90-3.75 Cc.	ʒ ⅓-i.
Tinctura Matico (10 per cent.) . . . . .	1.90-3.75 Cc.	ʒ ⅓-i.

## ACTION.

An aromatic tonic. It is also a hæmostatic.

## USE.

This is an unimportant therapeutic agent. It has been used for its hæmostatic properties.

## Φ KAVA-KAVA.

**Kava.** Kawa. Ava.

The root of the *Piper Methysticum* (Nat. ord., *Piperaceæ*). The odor is fragrant; taste pungent, slightly numbing.

Habitat. Sandwich Islands.

Chief constituents. A volatile oil, a resin, and a crystalline principle called kavahin or methysticin, which is somewhat analogous to cubebin.

## PREPARATIONS.

Extractum Kava-Kavæ . . . . . 0.06–0.12 Gm. gr. i–ij.

Extractum Kava-Kavæ Fluidum . . . . . 0.30–1.90 Cc. ℥v–xxx.

## ACTION.

Kava-Kava resembles cubebs in action; it is, however, less irritating—in fact it allays vesical, and urethral irritation.

## USE.

Kava-Kava has been used to good purpose, in the treatment of cystitis, gonorrhœa, etc. It is of benefit in the acute stage as well as in the sub-acute or chronic stage, in the treatment of vesical or urethral inflammations.

## MYRISTICA.

**Nutmeg.**

The seeds of *Myristica fragrans* (Nat. ord., *Myristicaceæ*), deprived of its testa. Odor, strongly aromatic; taste, aromatic, warm, and somewhat bitter.

Habitat. East Indies.

Chief constituents. A fixed oil (oil of mace), and a volatile oil.

Dose: 0.30–0.95 Gm. gr. v–xv.

## ACTION.

Carminative, stimulant, emmenagogue.

## USE.

This has but little importance as a therapeutic agent. It is used pharmaceutically as a flavoring agent.

## OLEUM MYRISTICÆ.

## Oil of Nutmeg.

A volatile oil distilled from nutmeg. It should be kept in well-stoppered bottles, in a cool place, protected from light.

It occurs as a thin, colorless, or pale-yellowish liquid, having the characteristic odor of nutmeg, and a warm, spicy taste. Sp. gr. : 0.870 to 0.900, at 15° C.

## PREPARATIONS.

Oleum Myristicæ . . . . . 0.06-0.30 Cc. ℞i-v.

Spiritus Myristicæ (5 per cent.) . . . . 0.60-1.25 Cc. ℞x-xx.

## ACTION AND USE.

The same as that of nutmeg, *q. v.*

## MACIS.

## Mace.

The arillode of the seed of *Myristica fragrans* (Nat. ord., *Myristicaceæ*).

Odor, fragrant; taste, warm, and aromatic.

Chief constituent. A volatile oil.

## ACTION.

That of nutmeg.

## USE.

It is not used therapeutically. Pharmaceutically, it is used as a flavoring agent.

## CINNAMOMUM ZEYLANICUM.

## Ceylon Cinnamon.

The inner bark of the shoots of *Cinnamomum Zeylanicum* (Nat. ord., *Laurinæ*).

Odor, fragrant; taste, sweet, warmly aromatic, somewhat astringent.

Habitat. Ceylon.

Chief constituents. A volatile oil, and tannic acid.

## PREPARATIONS.

Tinctura Cinnamomi (10 per cent.) . . . 1.90-3.75 Cc. 3½-i.

Pulvis Aromaticus (35 per cent.) . . . . 0.30-0.95 Gm. gr. v-xv.

Extractum Aromaticum Fluidum . . . . 0.30-1.90 Cc. ℞v-xxx.

## ACTION.

Carminative, stimulant, and astringent.

## USE.

Therapeutically, this is an unimportant agent. Pharmaceutically, it is used as an agreeable adjuvant to many preparations.

## CINNAMOMUM CASSIA.

**Cassia Cinnamon.** Cassia Bark.

The bark of the shoots of one or more undetermined species of *Cinnamomum* grown in China (Chinese Cinnamon) (Nat. ord., *Laurineæ*).

Odor, fragrant; taste, sweet, and warmly aromatic.

Habitat. China.

## PREPARATIONS.

Tinctura Cardamomi Composita (2 per cent.) . . . 1.90-3.75 Cc.  $3\frac{1}{2}$ -i.

Tinctura Catechu Composita (5 per cent.) . . . 1.90-3.75 Cc.  $3\frac{1}{2}$ -i.

Tinctura Lavandulæ Composita (2 per cent.) . . . 1.90-3.75 Cc.  $3\frac{1}{2}$ -i.

## ACTION AND USE.

The same as for Ceylon cinnamon. See p. 332.

## OLEUM CINNAMOMI.

**Oil of Cinnamon.** Oil of Cassia.

A volatile oil distilled from cassia cinnamon. It should be kept in well-stoppered bottles, in a cool place, protected from light.

It occurs as a yellowish or brownish liquid, having the characteristic odor of cinnamon, and a sweetish, spicy, and burning taste. Sp. gr.: 1.055 to 1.065, at 15° C.

## PREPARATIONS.

Oleum Cinnamomi . . . . . 0.06- 0.30 Cc.  $\mathfrak{M}$ i-v.

Aqua Cinnamomi ( $\frac{2}{10}$  per cent.) . . . 3.75-15.00 Cc.  $\mathfrak{Z}$ i-iv.

Spiritus Cinnamomi (10 per cent.) . . 0.60- 1.90 Cc.  $\mathfrak{M}_{x-xxx}$ .

## ACTION.

Carminative, stimulant, antiseptic.

## USE.

The oil may be used for its antiseptic properties. The water may be used as a pleasant vehicle. The spirit may be used as a carminative, in flatulence, etc.

## CINNAMOMUM SAIGONICUM.

**Saigon Cinnamon.**

The bark of an undetermined species of *Cinnamomum* (Nat. ord., *Laurineæ*). Odor, fragrant; taste, sweet, warmly aromatic, somewhat astringent.

Habitat. Cochin-China.

## ACTION AND USE.

The same as for the Ceylon cinnamon. See p. 332.

**SASSAFRAS.**

The bark of the root of *Sassafras variifolium* (Nat. ord., *Laurineæ*).  
Odor, characteristic, fragrant; taste, sweetish, aromatic.

Habitat. North America.

Chief constituents. A volatile oil, and tannic acid.

Dose: 3.75–15.00 Gm.  $\mathfrak{z}$ i–iv (in infusion).

**ACTION.**

Carminative, stimulant, alterative, and astringent.

**USE.**

An unimportant therapeutic agent. It may be used as a corrective, or alterative, in combination with other drugs.

**OLEUM SASSAFRAS.****Oil of Sassafras.**

A volatile oil distilled from sassafras. It should be kept in well-stoppered bottles, protected from light.

It occurs as a yellowish, or reddish-yellow liquid, having the characteristic odor of sassafras, and a warm, aromatic taste. Sp. gr.: 1.070 to 1.090, at 15° C.

Dose: 0.06–0.30 Cc.  $\mathfrak{m}$ i–v.

**ACTION.**

Carminative, stimulant, alterative.

**USE.**

An unimportant therapeutic agent. It is used as a flavoring agent, and as a corrective, or alterative, in combination with other drugs.

**SASSAFRAS MEDULLA.****Sassafras Pith.**

The pith of *Sassafras variifolium* (Nat. ord., *Laurineæ*).

It occurs in slender, cylindrical pieces; light, spongy, white, inodorous and insipid.

Chief constituent. Mucilage.

**PREPARATION.**

Mucilago Sassafras Medullæ (2 per cent.) . 3.75–15.00 Cc.  $\mathfrak{z}$ i–iv.

**ACTION.**

Demulcent.

**USE.**

In domestic practice it is used as a local dressing to inflamed surfaces. It may be used as a soothing gargle, or drink, in diseases of the mouth, or throat.



## Φ COTO.

The bark of an unknown tree (Nat. ord., probably *Laurineæ*).

Habitat. Peru, Bolivia.

Chief constituent. Cotoin.

## PREPARATIONS.

Coto (powdered) . . . . .	0.30-0.60 Gm. gr. v-x
Extractum Coto Fluidum . . . . .	0.30-0.60 Cc. ℥ v-x.
Tinctura Coto (10 per cent.) . . . . .	0.60-1.25 Cc. ℥ x-xx.
Cotoin . . . . .	0.03-0.12 Gm. gr. ½-ij.

## ACTION.

Coto appears to greatly increase intestinal absorption through dilatation of the intestinal vessels, and thus to arrest that form of diarrhœa depending upon diminished absorption. It has no apparent action beyond this local effect upon the intestinal tract. It is not an astringent.

## USE.

Coto has been found to be a very useful therapeutic agent in the treatment of certain forms of diarrhœa, not as an astringent but as a remedy promoting absorption.

## Φ PARACOTO.

The bark of a tree of which but little is known (Nat. ord., probably *Laurineæ*).

Habitat. Bolivia (?).

Chief constituent. Paracotoin.

## ACTION AND USE.

The same as that of Coto, *q. v.*

CAMPHORA.  $C_{10}H_{16}O$ .

**Camphor.** Gum Camphor.

A stearoptene obtained from the *Cinnamomum Camphora* (Nat. ord., *Laurineæ*), and purified by sublimation.

It occurs in white, translucent, tough, crystalline lumps, having a penetrating odor, and a pungent taste followed by a sensation of cold; it volatilizes slowly at ordinary temperature; it is pulverizable in the presence of a little alcohol, ether, or chloroform; it sublimes without residue, and burns with a luminous, smoky flame. Sparingly soluble in water; soluble in alcohol, ether, chloroform, volatile, and fixed oils. Sp. gr.: 0.995, at 15° C. It liquefies when triturated with thymol, menthol, carbolic acid, or chloral.

Habitat. China, and Japan.

## PREPARATIONS.

Camphora . . . . .	0.03-0.30 Gm. gr. $\frac{1}{2}$ -v.
Aqua Camphoræ ( $\frac{8}{10}$ per cent.) . . .	3.75-7.50 Cc. $\text{ʒi}$ -ij.
Spiritus Camphoræ (10 per cent.) . .	0.30-1.95 Cc. $\mathfrak{M}$ v-xv.
Ceratum Camphoræ (2 per cent.) . .	For external use.
Linimentum Camphoræ (20 per cent.)	For external use.
Linimentum Saponis ( $4\frac{1}{2}$ per cent.) .	For external use.

## ACTION.

Stimulant, anti-spasmodic, anæsthetic, anodyne, and rubefacient. Externally, camphor is stimulant, and rubefacient. Internally, it is stimulant and carminative, in small doses; irritant throughout the alimentary canal, in large doses.

The most marked action of the drug is upon the nervous system. Small doses increase mental activity, quiet restlessness, act as a sedative, and produce a feeling of comfort and well-being. It stimulates the respiratory centre. Small doses strengthen the heart's action and increase arterial tension by stimulating the vaso-motor centres. Camphor diminishes congestion when applied locally, or brought in contact with a surface during elimination, by causing contraction of the vessels, through local irritation. It may check secretion in the alimentary canal through a similar action.

Ordinary medicinal doses have little, if any, effect upon the urinary tract, but large doses may cause irritation.

It is eliminated by the skin, causing increased diaphoresis. In the sweating which accompanies debility (night-sweats), by its stimulating action, it may check diaphoresis.

## USE.

Locally, camphor may be used as an anti-pruritic, in diseases of the skin. It may be used in the treatment of coryza, either by inhaling the vapor, or by applying a powder, or ointment, of which camphor is an ingredient. It may be used by inhalation, in the treatment of laryngitis. It may be used as a rubefacient, and counter-irritant, in many inflammatory conditions. Internally, camphor may be used in the treatment of diarrhoea, of intestinal flatulence, of bronchitis, in some forms of headache, etc. It may be used as a cardiac, and respiratory stimulant, in pneumonia, typhoid fever, and other adynamic fevers.

Φ ACIDUM CAMPHORICUM.  $\text{C}_{10}\text{H}_{16}\text{O}_4$ .

## Camphoric Acid.

This occurs in the form of white crystals; odorless, with a feebly acid

taste. Sparingly soluble in cold water ; freely soluble in hot water, alcohol, and ether.

It is obtained by the action of nitric acid on camphor.

Dose : 0.60–1.25 Gm. gr. x–xx.

#### ACTION.

This has the general stimulating, and sedative action, of camphor.

#### USE.

In the sweating attendant upon wasting diseases. In the treatment of catarrhal affections of mucous membranes, etc.

### CAMPHORA MONOBROMATA. $C_{10}H_{15}Br$ .

#### Monobromated Camphor.

This occurs in colorless needles, or scales ; permanent in the air, with a camphoraceous odor and taste, and a neutral reaction. Almost insoluble in water ; freely soluble in alcohol, ether, chloroform, etc.

Prepared by heating together equal parts of bromine and camphor.

Dose : 0.12–0.30 Gm. ; gr. ij–v.

#### ACTION.

Camphor monobromate has the combined sedative action of camphor, and of the bromides.

Locally it has an irritant action.

#### USE.

It may be used as a hypnotic, in certain forms of insomnia ; in certain spasmodic affections, such as epilepsy, chorea, whooping-cough ; in rambling delirium, etc.

### MEZEREUM.

The bark of the *Daphne Mezereum*, and of other species of *Daphne* (Nat. ord. *Thymelacææ*).

Odorless ; taste, very acrid.

Habitat. Europe.

Chief constituent. A resin, termed mezerin.

#### PREPARATIONS.

Extractum Mezerii Fluidum . . . . . 0.06–0.30 Cc. ℥i–v.

Extractum Sarsaparillæ Fluidum Compositum

(3 per cent.) . . . . . 1.90–3.75 Cc. ʒ½–i.

Decoctum Sarsaparillæ Compositum (2 per

cent.) . . . . . 120.00–180.00 Cc. ʒiv–vj.

Linimentum Sinapis Compositum (20 per

cent.) . . . . . For external use.

## ACTION.

Irritant, vesicant, alterative.

## USE.

Locally, it may be used as a counter-irritant.

Internally, it is not used alone. Because of its supposed alterative properties it is sometimes used in combination with other supposed alteratives, as in the officinal preparations of sarsaparilla cited.

## OLEUM SANTALI.

**Oil of Santal.** Oil of Sandalwood.

A volatile oil, distilled from the wood of *Santalum Album* (Nat. ord. *Santalaceæ*).

It should be kept in well-stoppered bottles, in a cool place, protected from light.

It occurs as a colorless or yellowish liquid, having a peculiar terebinthinate odor, and a pungent, bitterish, camphoraceous taste. Sp. gr. : 0.910 to 0.940, at 15° C.

Dose: 0.30–0.60 Cc.; ℥v–x.

## ACTION AND USE.

Similar to that of Copaiba. See p. 261.

## STILLINGIA.

**Queen's-root.** Yaw-root.

The root of the *Stillingia silvatica* (Nat. ord. *Euphorbiaceæ*).

Odor, peculiar, unpleasant; taste, bitter, acrid, and pungent.

Habitat. United States.

Chief constituents. A volatile oil, resin, tannic acid, and a fixed oil.

## PREPARATIONS.

Stillingia (powdered) . . . . . 0.95–1.90 Gm. gr. xv–xxx.

Extractum Stillingiæ Fluidum . . . 0.95–1.90 Cc. ℥xv–xxx.

## ACTION.

Alterative, anti-syphilitic, emetic, laxative.

## USE.

This is an unimportant therapeutic agent. It may be used, in combination with other alteratives, in the treatment of syphilis. It may be used in the treatment of chronic constipation.

## ELASTICA.

**India-rubber.** Caoutchouc.

The prepared milk-juice of various species of *Hevea* (Nat. ord. *Euphorbiaceæ*). Known in commerce as Para Rubber.

Habitat. South America, and India.

Chief constituent. A colorless, solid hydrocarbon.

It occurs in cakes, balls, or hollow bottle-shaped pieces, externally blackish-brown, internally brownish; very elastic. Insoluble in water; soluble in chloroform, oil of turpentine, etc. Odor faint and peculiar; nearly tasteless. When pure, or nearly pure, it floats on water.

## USE.

This is used pharmaceutically, in making plasters.

## CASCARILLA.

The bark of the *Croton Eluteria* (Nat. ord. *Euphorbiaceæ*). When heated it emits a strong, aromatic, somewhat musk-like odor; its taste is warm, and very bitter.

Habitat. The Bahama Islands.

Chief constituent. A volatile oil.

Dose: 0.60–1.90 Gm. gr. x–xxx.

## ACTION.

An aromatic tonic.

## USE.

An unimportant therapeutic agent. It has been displaced by other and more satisfactory tonics.

## OLEUM RICINI.

**Castor Oil.**

A fixed oil expressed from the seeds of *Ricinus communis* (Nat. ord. *Euphorbiaceæ*). It should be kept in well-stoppered bottles.

It occurs as a pale yellowish, or almost colorless, transparent, viscid liquid, having a faint, mild odor, and a bland, afterwards slightly acid, generally offensive taste. Sp. gr. 0.950 to 0.970, at 15° C.

Habitat. East Indies.

Chief constituents. An acrid principle, and ricin-oleic acid.

Dose: 3.75–15.00 Cc. ʒi–iv.

## ACTION.

Externally, it is perfectly bland and protective. Internally, it acts as a



mild, simple purgative, without producing any marked irritation. Its purgative action is followed by a sedative action, due probably to the protective property of the oil.

#### USE.

Castor oil may be, but seldom is, used locally for its protective action.

Internally, it is used as a simple laxative.

#### OLEUM TIGLII.

##### Croton Oil.

A fixed oil expressed from the seeds of the *Croton Tiglium* (Nat. ord., *Euphorbiaceæ*). It should be kept in well-stoppered bottles, and should be handled with caution.

It occurs as a pale-yellow, or brownish-yellow, somewhat viscid, and slightly fluorescent liquid, having a slight, fatty odor, and a mild, oily, afterwards acrid, and burning taste. (Great caution is necessary in tasting.) Sp. gr.: 0.040 to 0.060, at 15° C.

Dose: 0.03-0.12 Cc. M  $\frac{1}{2}$ -ij.

#### ACTION.

Externally, that of an irritant, causing a peculiar, pustular eruption. Internally, it acts as a violent drastic cathartic, causing great irritation throughout the intestinal canal, and increasing both secretion, and peristalsis. A large dose may cause intense inflammation of the intestinal canal, followed by collapse and death.

#### USE.

Locally, croton oil is used as a counter-irritant. Great care must be taken in making the application.

Internally, it may be used when prompt and vigorous catharsis is desired.

#### KAMALA.

##### Rottleria.

The glands and the hairs from the capsules of the *Mallotus philippinensis* (Nat. ord., *Euphorbiaceæ*). It is inodorous, and nearly tasteless.

Habitat. Tropical Asia, and Africa.

Chief constituents. Resins.

Dose: 3.75-7.50 Gm. ʒi-ij.

#### ACTION.

Anthelmintic.

#### USE.

Kamala may be used to cause the expulsion of tape-worm from the intestinal canal.

## ULMUS.

**Slippery elm. Red elm.**

The inner bark of the *Ulmus fulva* (Nat. ord., *Urticaceæ*). Odor, slight, peculiar; taste, mucilaginous, insipid.

Habitat. North America.

Chief constituents. Mucilage, and some tannic acid.

## PREPARATION.

Mucilago Ulmi . . . . . Ad libitum.

## ACTION.

Demulcent.

## USE.

Slippery elm may be used locally in the form of a poultice.

Internally, it is used for its demulcent action, in diseases of the mouth, or pharynx.

## HUMULUS.

**Hops.**

The strobiles of the *Humulus Lupulus* (Nat. ord., *Urticaceæ*). Odor, aromatic; taste, bitter, aromatic, and slightly astringent.

Habitat. The North Temperate Zone.

Chief constituent. Lupulin.

## PREPARATION.

Tincturi Humuli (20 per cent.) . . . . . 3.75-15.00 Cc. ʒi-iv.

## ACTION.

That of a bitter tonic, and of a hypnotic.

## USE.

This is not an important therapeutic agent. Externally, it is used in the form of a poultice, as an anodyne. In domestic practice the hop pillow is used as a hypnotic; the hypnotic effect, here, is largely mental.

## LUPULINUM.

The glandular powder separated from the strobiles of the *Humulus Lupulus*. Odor, peculiar, aromatic, like hops, but stronger; taste, aromatic, and bitter.

Chief constituents. A volatile oil, and resin.

## PREPARATIONS.

Extractum Lupulini Fluidum . . . . . 0.30-0.95 Cc. ℥v-xv.

Oleoresina Lupulini . . . . . 0.12-0.30 Cc. ℥ij-v.

## ACTION.

Lupulin has mild hypnotic properties. It also has the action of a mild, bitter tonic.

## USE.

It may be used to promote digestion. It may be used in the treatment of some forms of insomnia.

## CANNABIS INDICA.

**Indian Hemp.** Gunjah. Haschisch.

The flowering tops of the female plant *Cannabis sativa* (Nat. ord., *Urticaceæ*). Odor, peculiar; taste, slightly acrid.

Habitat. East Indies.

Chief constituents. Resin (cannabin), and a volatile oil.

## PREPARATIONS.

Extractum Cannabis Indicæ . . . . . 0.01–0.06 Gm. gr.  $\frac{1}{6}$ –i.

Extractum Cannabis Indicæ Fluidum . 0.03–0.06 Cc. ℥  $\frac{1}{2}$ –i.

Tinctura Cannabis Indicæ (15 per cent.) 0.30–1.25 Cc. ℥ v–xx.

## ACTION.

*Cannabis Indica* acts chiefly upon the cerebral centers. Small doses give rise to delirium, with hallucinations of a gay, or disagreeable, character, accompanied by a curious loss of the sense of time and space. This stage of delirium is generally followed by deep sleep, accompanied by dreams of a disagreeable, or pleasing, character according to circumstances. Large doses cause prolonged sleep, or even a cataleptic state.

The sensory nerves are benumbed, and there is partial anæsthesia. The local use of the drug for its possible anæsthetic action is prevented by its preceding irritant effect.

The unpleasant after-effects attending the use of opium are not present. The appetite is stimulated rather than depressed; there is no constipation. The urine is increased in quantity.

## USE.

*Cannabis indica* may be used in the treatment of migraine; in paralysis agitans; in certain spasmodic diseases, such as whooping-cough, asthma, chorea, etc.; and in spasm of the bladder. In advanced phthisis it might be used to produce a condition of euthanasia.

## FICUS.

**Fig.**

The fleshy receptacle of *Ficus Carica* (Nat. ord., *Urticaceæ*). It has a sweet, fruity odor, and a very sweet, mucilaginous taste.

Habitat. The Levant.

Chief constituent. Grape sugar.

## PREPARATION.

In Confectio Sennæ . . . . . See Senna.

## ACTION.

Nutrient, laxative.

## USE.

This is an unimportant therapeutic agent. It may be used for its laxative action alone, or in combination with other fruity laxatives.

## JUGLANS.

**Butter nut.**

The bark of the root of *Juglans cinerea* (Nat. ord., *Juglandaceæ*), collected in the autumn. The odor is feeble; taste, bitter, and somewhat acid.

Habitat. North America.

Chief constituents. Mucin, a fixed oil, a volatile oil, and tannic acid.

## PREPARATION.

Extractum Juglandis . . . . . 0.30-0.60 Gm. gr. v-x.

## ACTION.

It has the action of a mild cathartic, and hepatic stimulant.

## USE.

Butternut may be used alone or, better, in combination with other suitable laxatives, in the treatment of chronic constipation.

## QUERCUS ALBA.

**White-oak.**

The bark of the *Quercus alba* (Nat. ord., *Cupuliferæ*). This has a faint, tan-like odor, and a strongly astringent taste.

Habitat. North America.

Chief constituents. Tannic acid, and querco-tannic acid.

Dose: 0.30-1.25 Gm. gr. v-xx. (In infusion.)

## ACTION AND USE.

That of tannic acid. See p. 344.

## GALLA.

**Nutgall.**

Excrescences on the *Quercus lusitanica* (Nat. ord., *Cupuliferæ*), caused by the punctures and deposited ova of *Cynips Gallæ tinctoriæ*

(class, *Insecta*; order, *Hymenoptera*). This is nearly inodorous; taste, strongly astringent.

Habitat. Asia Minor chiefly.

Chief constituents. Tannic, and gallic acids.

#### PREPARATIONS.

Tinctura Gallæ (20 per cent.) . . . . 1.90–3.75 Cc. 3½–i.

Unguentum Gallæ (20 per cent.) . . . . For external use.

#### ACTION AND USE.

That of tannic acid, *q. v.*

#### ACIDUM TANNICUM. $\text{HC}_{14}\text{H}_9\text{O}_9$ .

**Tannic Acid.** Tannin. Gallotannic acid. Digallic acid.

An organic acid obtained from nutgall. It occurs as a light-yellowish, amorphous, powder, usually cohering in form of glistening scales or spongy masses; odorless, or having a faint characteristic odor, a strongly astringent taste, and an acid reaction. Soluble, at 15° C., in 1 part of water, and in 0.6 part of alcohol; also in about 1 part of glycerin with the intervention of a moderate heat.

Obtained by dissolving out the tannic acid from powdered galls, by means of ether mixed with a very little water; gently evaporating this solution, and drying the product.

#### PREPARATIONS.

Acidum Tannicum . . . . . 0.06–0.60 Gm. gr. i–x.

Collodium Stypticum . . . . . For external use.

Glyceritum Acidi Tannici (20 per cent.) For external use.

Trochisci Acidi Tannici . . . . . 1 = 0.06 Gm. gr. i.

Unguentum Acidi Tannici (20 per cent.) For external use.

#### ACTION.

Tannic acid, applied to a denuded surface, or to a mucous surface, causes coagulation of albumin and a contraction of cells. This “tanning” of the tissues has a constricting effect upon the vessels. In contact with the blood it coagulates its albumin and favors the formation of a clot. These two properties give tannic acid its astringent action. It does not cause contraction of the blood-vessels; in fact, the direct effect upon blood-vessels tends to cause them to dilate. Through its constricting action it checks secretion, and causes a dryness of the mucous surface. When taken into the stomach, a large dose has an irritant action throughout the alimentary canal, and may cause vomiting and diarrhœa followed by constipation.



Tannic acid is absorbed as gallic acid, and eliminated as gallic acid, or some product of the oxidation of gallic acid. When given in excess a part may be eliminated unchanged through the intestinal canal; possibly by the urinary tract. Tannic acid can be used for its constringing action only where the drug can be brought into direct contact with the part.

The vegetable astringents owe their astringency to the tannic acid which they contain.

The chemical property that tannic acid has of forming tannates which are but sparingly soluble, gives it a valuable antidotal power in the treatment of poisoning by the alkaloids, or by tartar emetic.

#### USE.

Tannic acid may be used to advantage locally, upon mucous membranes, and upon abraded surfaces, when an astringent action is wanted. Because of its irritant properties, it should be used in a diluted form, as in the glycerite of tannic acid.

Internally it is used for its astringent action throughout the intestinal canal, as in atonic diarrhœa, etc.

It is also used in the treatment of poisoning from the various alkaloids.

#### ACIDUM GALLICUM. $\text{HC}_7\text{H}_5\text{O}_5 + \text{H}_2\text{O}$ .

##### Gallic Acid.

An organic acid, usually prepared from tannic acid.

It occurs as white, or pale fawn-colored, silky, interlaced needles; odorless, having an astringent, or slightly acidulous taste, and an acid reaction. Permanent in the air. Soluble, at  $15^\circ \text{C}$ ., in 100 parts of water, and in 5 parts of alcohol; soluble in 3 parts of boiling water, and in 1 part of boiling alcohol; in 40 parts of ether, and in 12 parts of glycerin.

It may be prepared from galls by pulverizing, moistening with water, and allowing them to ferment for six weeks in a temperature of  $15^\circ$  to  $20^\circ \text{C}$ . The tannic acid present in the galls is split up, by the fermentation, into gallic acid, and glucose.

Its aqueous solution gives no precipitate with solution of isinglass, and is thus distinguished from tannic acid.

Dose: 0.30–1.90 Gm.; gr. v–xxx.

#### ACTION.

Gallic acid does not coagulate albumin and therefore cannot constrict vessels, or favor the formation of a clot when in contact with blood. It is hard to understand, therefore, how gallic acid has any of the astringent qualities of tannic acid, and yet it is supposed to have an astringent action on remote organs when given internally in its own form, or obtained as a product of tannic acid.

## USE.

Gallic acid is used in hæmoptysis, hæmaturia, colliquative sweats, and bronchorrhœa. It is also used in certain forms of albuminurea.

## CASTANEA.

## Chestnut.

The leaves of the *Castanea vesca* (Nat. ord., *Cupuliferæ*), collected in September, or October, while still green.

The odor is slight; taste, somewhat astringent.

Habitat. North America.

Chief constituents. Tannic acid, and gum resin.

## PREPARATIONS.

Extractum Castaneæ Fluidum . . . . . 3.75-7.50 Cc. ℥i-ij.

## ACTION.

Tonic, astringent, sedative.

## USE.

This has been considered of benefit in the treatment of whooping-cough, asthma, etc. It is an unimportant therapeutic agent.

## SABINA.

## Savine.

The tops of the *Juniperis Sabina* (Nat. ord., *Coniferæ*). These have a strong, balsamic odor; taste, bitter, acrid.

Habitat. Southern Europe.

Chief constituent. A volatile oil.

## PREPARATION.

Extractum Sabinæ Fluidum . . . . . 0.18-0.60 Cc. ℥iij-x.

## ACTION.

Irritant, emmenagogue, diuretic.

## USE.

Savine is an unimportant, and dangerous, therapeutic agent.

## OLEUM SABINÆ.

## Oil of Savine.

A volatile oil distilled from savine. It should be kept in well-stoppered bottles, protected from light.

It occurs as a colorless, or yellowish liquid, having a peculiar terebinthinate odor, and a pungent, bitter, and camphoraceous taste. Sp. gr.: 0.910 to 0.940, at 15° C.

Dose: 0.06-0.30 Cc. ℥i-v.

## ACTION AND USE.

That of savine. See p. 346.

## OLEUM JUNIPERI.

## Oil of Juniper.

A volatile oil distilled from the fruit of *Juniperis communis* (Nat. ord., *Coniferae*). It should be kept in well-stoppered bottles, in a cool place, protected from light.

It occurs as a colorless, or faintly greenish-yellow liquid, having the characteristic odor of juniper, and a warm, aromatic, somewhat terebinthinate, and bitterish taste. Sp. gr. : 0.850 to 0.890, at 15° C.

## PREPARATIONS.

Oleum Juniperi . . . . .	0.06-0.30 Cc. ℥i-v.
Spiritus Juniperi (5 per cent.) . . . . .	0.60-3.75 Cc. ℥x-ʒi.
Spiritus Juniperi Compositus (4 per cent.)	3.75-15.00 Cc. ʒi-iv.

## ACTION.

That of a stimulating diuretic, and expectorant, resembling in a general way the action of oil of turpentine. See p. 348.

## USE.

This is an unimportant therapeutic agent. The preparations of Juniper oil may be used in dropsical conditions. It should not be employed when inflammatory diseases of the kidneys are present.

## OLEUM CADINUM.

## Cade Oil. Empyreumatic oil of Juniper.

A product of the dry distillation of the wood of *Juniperus Oxycedrus* (Nat. ord., *Coniferae*).

It occurs as a brownish, or dark brown, clear, thick liquid, having a tarry odor, and an empyreumatic, burning, somewhat bitter taste. Sp. gr. : 0.922-0.929, at 15° C.

Dose : 0.06-0.30 Cc. ℥i-v.

## ACTION.

Stimulant, antiseptic, parasiticide.

## USE.

Oil of cade is used externally in the treatment of certain chronic skin diseases, and in parasitic skin diseases. It is applied in liniments, or in soft potash soaps, pure, or dissolved in alcohol. Its preparations have the same general effect as analogous ones made with tar ; are less irritating ; have less odor ; and are less injurious to clothing.

## TEREBINTHINA.

**Turpentine.**

A concrete oleoresin obtained from *Pinus palustris*, and from other species of *Pinus* (Nat. ord., *Coniferæ*).

It occurs in yellowish, tough masses; brittle in the cold; of a terebinthinate odor, and taste.

Habitat. United States.

Chief constituents. A volatile oil, and resin.

## ACTION AND USE.

The same as that of oil of turpentine, *q. v.*

## OLEUM TEREBINTHINÆ.

**Oil of Turpentine.** Spirits of Turpentine.

A volatile oil distilled from turpentine. It should be kept in well-stoppered bottles, protected from light.

It occurs as a thin, colorless liquid, having a characteristic odor, and taste, and a neutral, or slightly acid, reaction in an alcoholic solution. Sp. gr. : 0.855 to 0.870, at 15° C.

## PREPARATIONS.

Oleum Terebinthinæ . . . . . For external use.

Oleum Terebinthinæ Rectificatum . . . . 0.30–1.25 Cc. M<sub>v</sub>–xx.

Linimentum Terebinthinæ (35 per cent.) . For external use.

## ACTION.

Oil of turpentine applied locally acts as a stimulant, or irritant. Inhaled, it has a similar action on the bronchial mucous membrane. Taken internally, it exercises its irritant action throughout the alimentary canal. In the stomach it causes a sensation of heat, and a large dose is followed by nausea, and vomiting. In the intestines a large dose acts as a purgative, and, if sufficient is given, may cause violent inflammation. During its elimination by the kidneys its irritant action is also apparent; small doses increase the quantity of urine; large doses diminish the quantity of urine and give rise to painful micturition, or even hæmaturia.

Blood pressure is increased through stimulation of the vaso-motor centres, causing diminished calibre of the vessels, and also strengthening the heart's action. Local application may cause diminished calibre of vessels, through reflex stimulation. Turpentine may therefore exercise a hæmostatic action through local, or internal use. Following vaso-motor stimulation comes paralysis, with dilatation of vessels, and fall of blood-pressure; this is the usual condition when the drug is applied locally, to the extent of producing rubefaction.

Turpentine is antiseptic, and this action may be secured to a moderate degree throughout the alimentary canal, and along other lines of elimination.

Turpentine absorbs oxygen readily, and old "ozonized" turpentine may be more active, in certain ways, than the fresh oil.

#### USE.

Turpentine may be used to cleanse the skin preparatory to a surgical operation. It may be used locally to arrest hemorrhages, as from leech bites, after the extraction of a tooth, hemorrhage from wounds, or from an ulcerated surface. In the form of a stupe it is used as a counter-irritant. It is used both locally and externally in the treatment of diphtheria. It is a very reliable hæmostatic in the treatment of hæmoptysis, hæmatemesis, hæmaturia, intestinal hemorrhages, uterine hemorrhage, etc. It may be used by inhalation, or internally, in the treatment of chronic bronchitis, laryngitis, etc. It may be used for its stimulating and antiseptic action in certain diseases of the genito-urinary tract. It may be used in typhoid fever as a diffusible stimulant, as a carminative, as an intestinal antiseptic, and as a hæmostatic.

#### TEREBENUM. $C_{10}H_{16}$ .

##### Terebene.

A mixture of several terpenes, resulting from the distillation of turpentine with sulphuric acid. It should be kept in well-stoppered bottles, in a cool place, protected from light.

It occurs as a colorless, or slightly yellowish, thin liquid, having a rather agreeable, thyme-like odor, and an aromatic, somewhat terebinthinate taste. Sparingly soluble in water; soluble in an equal volume of alcohol. Sp. gr.: about 0.862 at 15° C.

Dose: 0.30–1.25 Cc. Mv–xx.

#### ACTION.

Terebene has the stimulating and antiseptic action of turpentine along the lines of elimination. It is not so irritant as turpentine, and is more agreeable to the taste.

#### USE.

Terebene is a useful therapeutic agent in the treatment of subacute or chronic bronchitis; in certain subacute or chronic inflammatory conditions of the genito-urinary tract; in fermentative dyspepsia; etc.

#### TERPINI HYDRAS. $C_{10}H_{16}(OH)_2 + H_2O$ .

##### Terpin Hydrate.

The hydrate of the diatomic alcohol Terpin. It should be kept in well-



stoppered bottles. It is obtained by the action of acids and diluted alcohol upon turpentine.

It occurs in colorless or lustrous prisms, nearly odorless, and having a slightly aromatic and somewhat bitter taste. Sparingly soluble in water; soluble in 10 parts of alcohol.

Dose: 0.30–0.60 Gm. gr. v-x.

#### ACTION.

Terpin Hydrate has the same action as has terebene; possibly to a less marked degree. Being a solid it can be prescribed conveniently in pill form.

#### USE.

Terpin hydrate may be used internally in the same class of cases as referred to under terebene.

#### RESINA.

##### Rosin. Colophony.

The residue left after distilling off the volatile oil from the turpentine; it is the portion of turpentine fixed by oxidation. It occurs as a transparent, amber-colored substance, hard, brittle and having a faintly terebinthinate odor and taste. Sp. gr.: 1.070 to 1.080. Soluble in alcohol, ether, fixed, and volatile oils.

#### PREPARATIONS.

Ceratum Resinæ (Basilicon Ointment).

Emplastrum Resinæ (Adhesive Plaster).

#### USE.

This is used pharmaceutically, in preparing cerates and plasters; by preventing the oxidation of the fatty bases it tends also to preserve them. Plasters and cerates containing resin may be used when mild local stimulation is wanted.

#### PIX LIQUIDA.

##### Tar.

An empyreumatic oleoresin, obtained by the destructive distillation of the wood of *Pinus Palustris* and of other species of *Pinus* (Nat. ord., *Coniferæ*).

It is thick, viscid, semi-fluid, blackish-brown, of a well-known characteristic odor, and a sharp, empyreumatic taste. Sparingly soluble in water; soluble in alcohol, fixed, or volatile oils.

Chief constituents. Pyroligneous acid, creosote, hydrocarbons, methyl alcohol, acetic acid, and oily bodies.

#### PREPARATIONS.

Syrupus Picis Liquidæ (7½ per cent.) . . 1.90–7.50 Cc. 3½–ij.

Unguentum Picis Liquidæ (5 per cent.) . For external use.

## ACTION.

The several tar products have a stimulating action, whether applied to the skin, or to mucous membrane. They also have some antiseptic properties at the point of application, or along the lines of excretion. Because of their constituents they bear some resemblance to creosote, and to turpentine, in action.

## USE.

Tar may be used locally, in the treatment of certain chronic skin diseases. As a spray, some preparation of tar may be used in the treatment of chronic pharyngitis, chronic laryngitis, ozena, etc,

Internally, tar, in some preparation, may be used in the treatment of chronic bronchitis, in phthisis, etc.

## OLEUM PICIS LIQUIDÆ.

## Oil of Tar.

A volatile oil distilled from tar.

It is an almost colorless liquid when freshly distilled, but soon acquires a dark reddish-brown color. It has a strong, tarry odor, and taste. Sp. gr. : about 0.970 at 15° C.

Dose : 0.06–0.30 Cc. ℥ i–v.

## ACTION.

This, like tar, has a stimulating, and antiseptic action, both at the seat of application, and along the lines of elimination.

## USE.

It may be used in subacute or chronic diseases of the skin ; of the respiratory tract ; or of the genito-urinary tract, when stimulating antiseptics are needed.

## TEREBINTHINA CANADENSIS.

## Canada Turpentine. Canada Balsam.

A liquid oleo-resin obtained from the *Abies balsamea* (Nat. ord. *Coniferae*).

A yellowish or faintly greenish, transparent, viscid liquid, of an agreeable terebinthinate odor, and a bitterish, slightly acrid taste ; slowly drying on exposure to the air, and then forming a transparent mass. Soluble in ether, and in chloroform.

Habitat. Canada, Northern United States.

Chief constituents. A volatile oil, and resin.

## PREPARATION.

In collodion flexible.

## ACTION AND USE.

Canada balsam has medicinal properties similar to the turpentine. It is seldom used therapeutically.

## PIX BURGUNDICA.

**Burgundy Pitch.**

The prepared resinous exudation of *Abies excelsa* (Nat. ord., *Coniferæ*).

It is hard, yet gradually takes the form of the vessel in which it is kept; brittle, opaque or translucent, reddish-brown or grayish-brown, aromatic, and somewhat empyreumatic, not bitter. Soluble in glacial acetic acid.

Habitat. Europe.

Chief constituents. A volatile oil, resin, etc.

## PREPARATIONS.

Emplastrum Picis Burgundicæ.

Emplastrum Picis Cantharidatum (see Cantharis).

## ACTION.

That of a local stimulant, and rubefacient.

## USE.

Burgundy pitch is used as a local stimulant, in the form of a plaster, in the treatment of lumbago, and in chronic rheumatism. The plaster is also used over the chest, in chronic bronchitis, phthisis, etc.

## CYPRIPIEDIUM.

**Ladies'-slipper.** American Valerian.

The rhizome and the roots of the *Cypripedium pubescens*, and of *Cypripedium parviflorum* (Nat. ord., *Orchideæ*). The odor is peculiar, heavy; taste sweetish, somewhat pungent.

Habitat. North America.

Chief constituents. A volatile oil, a fixed oil, a volatile acid, tannic acid, and resin.

## PREPARATION.

Extractum Cypripedii Fluidum . . . . . 0.30-0.90 Cc. M<sub>v</sub>-xv.

## ACTION.

Antispasmodic and sedative like valerian, but less powerful.

## USE.

This is an unimportant therapeutic agent.

## VANILLA.

The fruit of the *Vanilla panifolia* (Nat. ord., *Orchideæ*). Odor and taste peculiar, fragrant.

Habitat. Mexico.

Chief constituent. Vanillin.

## PREPARATION.

Tinctura Vanillæ (10 per cent.) . . . . . For flavoring.

## ACTION.

Carminative.

## USE.

This is an unimportant therapeutic agent. It is used chiefly as a flavoring agent.

## ZINGIBER.

## Ginger.

The rhizome of the *Zingiber officinale* (Nat. ord., *Scitamineæ*). Odor agreeable, aromatic; taste warm, spicy.

Habitat. Hindostan.

Chief constituents. A volatile oil, and resin.

## PREPARATIONS.

Zingiber (powdered) . . . . . 0.60-1.25 Gm. gr. x-xx.

Oleoresina Zingiberis . . . . . 0.03-0.12 Cc. ℥½-ij.

Extractum Zingiberis Fluidum . . . . . 0.60-1.25 Cc. ℥x-xx.

Syrupus Zingiberis (fd. ext. 3 per cent.) . . 1.90-3.75 Cc. 3½-i.

Tinctura Zingiberis (20 per cent.) . . . . 1.90-3.75 Cc. 3½-i.

Trochisci Zingiberis . . . . . 1 = tincture 0.12 Cc. ℥ij.

Pulvis Aromaticus (35 per cent.) . . . . . 0.60-1.90 Gm. gr. x-xxx.

Pulvis Rhei Compositus (10 per cent.) . . . 1.90-3.75 Gm. 3½-i.

## ACTION.

Carminative, stimulant.

## USE.

Ginger may be used as an adjuvant in bitter tonic preparations. It may also be used in flatulence, colic, diarrhoea, etc.

## CARDAMOMUM.

## Cardamom.

The fruit of the *Elettaria repens* (Nat. ord., *Scitamineæ*). It has an agreeable odor, and a pungent, aromatic taste.

Habitat. Malabar.

Chief constituents. A volatile, and a fixed oil.

## PREPARATIONS.

Tinctura Cardamomi (10 per cent.) . . . . . 190-3.75 Cc.  $\frac{3}{2}$ -i.  
 Tinctura Cardamomi Composita (20 per cent.) . . 1.90-3.75 Cc.  $\frac{3}{2}$ -i.

## ACTION.

Carminative, stimulant.

## USES.

This is an unimportant therapeutic agent. It is used as an adjuvant in the treatment of flatulence, colic, etc.

## IRIS.

**Blue-flag.**

The rhizome and roots of the *Iris versicolor* (Nat. ord., *Iridaceæ*).  
 Odor slight; taste acrid, and nauseous.

Habitat. United States.

Chief constituents. An acid resin, tannin, etc.

## PREPARATIONS.

Iris (powdered) . . . . . 0.30-0.60 Gm. gr. v-x.  
 Extractum Iridis . . . . . 0.06-0.12 Gm. gr. i-ij.  
 Extractum Iridis Fluidum . . . . . 0.30-0.60 Cc. ℥ v-x.  
 Ø Iridin . . . . . 0.12-0.30 Gm. gr. ij-v.

The so-called "iridin" is an oleoresin, not an active principle, as might seem probable, from the name.

## ACTION.

This has the action of a cholagogue, increasing the secretion of bile; a purgative, increasing intestinal secretion, and peristalsis. It has a less irritant action in the intestinal canal than has podophyllin.

## USES.

Iris may be used in the treatment of "biliousness," in obstructive jaundice, in chronic constipation, etc.

## CROCUS.

**Saffron.**

The stigmas of *Crocus sativus* (Nat. ord., *Iridaceæ*). Odor strong, peculiar, aromatic; taste, bitterish, and aromatic.

Habitat. Asia Minor, and Greece.

Chief constituents. Crocin, and a volatile oil.

## PREPARATION.

Tinctura Croci (10 per cent.) . . . . . 1.90-3.75 Cc.  $\frac{3}{2}$ -i.



## ACTION.

Carminative, also a coloring agent.

## USES.

This is a very unimportant therapeutic agent; practically not used at all.

## SARSAPARILLA.

The root of *Smilax officinalis*, *Smilax medica*, *Smilax papyracea*, and other undetermined species of *Smilax* (Nat. ord., *Liliaceæ*). It is nearly inodorous; taste mucilaginous, bitterish, and acrid.

Habitat. Tropical America.

Chief constituents. Parillin (Smilacin and Parillic acid), a volatile oil, and resin.

## PREPARATIONS.

Decoctum Sarsaparillæ Compositum . . 15.00–30.00 Cc. 3½–i.

Extractum Sarsaparillæ Fluidum . . . . 1.90– 3.75 Cc. 3½–i.

Extractum Sarsaparillæ Fluidum

Compositum . . . . . 1.90– 3.75 Cc. 3½–i.

Syrupus Sarsaparillæ Compositus . . . 3.75–15.00 Cc. 3i–iv.

## ACTION.

By some sarsaparilla is supposed to act as an alterative and anti-syphilitic; by many it is considered inert.

## USE.

The compound syrup is the preparation most generally used, and this chiefly as a vehicle for potassium iodide.

## CONVALLARIA.

## Lily of the Valley.

The rhizome and roots of *Convallaria majalis* (Nat. ord., *Liliaceæ*). Odor peculiar, pleasant; taste, sweetish, bitter, and somewhat acrid.

Habitat. United States, Europe, and Northern Asia.

Chief constituent. *Convallamarin*,  $C_{22}H_{44}O_{12}$ , which is a whitish-brown, amorphous powder; soluble in water, and in alcohol.

## PREPARATIONS.

Extractum Convallariæ Fluidum . . . . 0.12–0.60 Cc. ℥ij–x

∅ Convallamarin . . . . . 0.03–0.12 Gm. gr. ½–ij.

## ACTION.

A heart tonic, resembling digitalis, but without cumulative properties. It is less certain in action than digitalis.

## USE.

The preparations of convallaria may be used as a substitute for, or an alternate with, digitalis, in the treatment of organic heart disease.

## VERATRUM VIRIDE.

**American Hellebore.** Green Hellebore. Indian Poke.

The rhizome and roots of the *Veratrum viride* (Nat. ord., *Liliaceæ*).

Inodorous ; taste bitterish, and very acrid.

Habitat. North America.

Chief constituents Jervine, pseudo-jervine, cevadine, a little rubijervine (sometimes called veratroidine), and a trace of veratrine and veratralbine.

**Jervine**,  $C_{26}H_{47}NO_3$ , is crystalline, tasteless, and insoluble in water.

**Rubijervine** (veratroidine),  $C_{26}H_{43}NO_2$ , is not crystallizable and not soluble in water.

## PREPARATIONS.

Extractum Veratri Viridis Fluidum . . 0.06–0.12 Cc. ℥i–ij.

Tinctura Veratri Viridis (40 per cent.) 0.18–0.48 Cc. ℥iij–viij.

♅ Norwood's Tinctura Veratri Viridis

(55 per cent.) . . . . . 0.12–0.30 Cc. ℥ij–v.

## ACTION.

The action of veratrum viride is due to the jervine and other alkaloids which it contains.

It closely resembles aconite as a cardiac depressant, and as a spinal paralyzant.

**Jervine** has a marked depressant action on the heart. The pulse is slow, due to an action on the cardiac muscle. The functions of the cord, and of the medulla (especially the vaso-motor centre) are greatly depressed ; hence, there is muscular weakness, loss of reflex action, and lowered blood-pressure.

The motor centres in the brain are irritated and convulsions result. The convulsions soon give place to paralysis.

There is no evidence of irritation throughout the alimentary canal—no vomiting or purging.

Death, if it occurs, is due to paralysis of the respiratory centre, and an almost simultaneous failure of the heart

**Rubijervine** has an irritant action, and causes nausea and vomiting. It also depresses the spinal cord and paralyzes the respiratory centre. It slows the pulse by stimulating the vagus centre, but finally quickens the pulse by paralyzing the vagus ends

The convulsions produced by rubijervine are less violent than those produced by jervine.

The summary given by Wood of the effect of *veratrum viride* on the circulation is as follows: *Veratrum viride* slows the pulse by a direct depressant action on the heart muscle (jervine), and by stimulating the pneumogastric nerves (veratroidine); it lowers blood-pressure by an action on the heart muscle (jervine), and by depression of the vaso-motor centre (jervine).

#### USE.

*Veratrum viride* is useful as a sedative, and to relieve congestion in the *acute* stage of sthenic inflammations, such as pneumonia, pleurisy, peritonitis, cerebritis, etc. It may also be used in some forms of asthma, in palpitation of the heart, in puerperal convulsions, in aneurism, etc. A hard, bounding pulse is an indication for its use. It should never be used in conditions of depression, or of exhaustion.

#### TOXICOLOGY.

The symptoms of poisoning are, muscular weakness, great prostration, increased salivary and cutaneous secretion, convulsions, vomiting, and, sometimes, purging. Vomiting is apt to occur before a sufficient quantity of the drug is absorbed to produce a fatal result; it thus acts as its own antidote. Further treatment in poisoning is, the use of the syphon tube; the use of cardiac stimulants, such as strychnine, atropine, external heat, etc. The recumbent posture must be insisted upon.

#### Φ VERATRUM ALBUM.

**White Hellebore.** European Hellebore.

The rhizome and rootlets of *Veratrum Album* (Nat. ord., *Liliaceæ*). It is odorless; the taste is bitter, and acrid.

Habitat. Europe, and Asia.

Chief constituents. Jervine, pseudo-jervine, rubijervene, and veratralbine.

Dose: 0.005–0.03 Gm. gr.  $\frac{1}{12}$ – $\frac{1}{2}$ .

#### ACTION.

The action of *veratrum album* is quite similar to that of *veratrum viride*, except that it is more toxic. Vomiting and purging are more apt to occur after the use of *veratrum album* than of *veratrum viride*.

#### USE.

Small doses may be used in the treatment of diarrhœa, dysentery, etc.

#### VERATRINA.

A mixture of alkaloids obtained from the seeds of *Asagrea officinalis* (Nat. ord., *Liliaceæ*).

A white or grayish-white, amorphous or semi-crystalline powder ; permanent in the air ; odorless, of a distinctive acrid taste, leaving a sensation of tingling and numbness on the tongue, and producing constriction of the fauces. Sparingly soluble in water ; soluble in 3 parts of alcohol at 15° C.

#### PREPARATIONS.

Veratrinæ . . . . . 0.001-0.002 Gm. gr.  $\frac{1}{60}$ - $\frac{1}{30}$ .  
 Oleatum Veratrinæ (2 per cent.) . For external use.  
 Unguentum Veratrinæ (4 per cent.) . For external use.

#### ACTION.

Veratrine is locally, irritant and causes a sensation of warmth. Applied to the nasal mucous membrane it causes violent sneezing. It soon paralyzes the ends of the sensory nerves, producing a sensation of prickling or tingling, followed by numbness. This effect is produced whether the drug is applied locally, or taken internally ; it resembles aconite in this respect. Muscles lose their contractile power.

Death comes from paralysis of the respiratory centre.

The general action of the drug is uncertain and dangerous, hence it is seldom used internally.

#### USE.

If used with care, veratrine may be applied externally in the treatment of neuralgias. It is not a safe therapeutic agent.

### ALLIUM.

#### Garlic.

The bulb of *Allium sativum* (Nat. ord., *Liliaceæ*). The odor is pungent, and disagreeable ; taste warm, and acrid.

Habitat. Italy, etc.

Chief constituent. A volatile oil (resembling oil of mustard).

#### PREPARATION.

Syrupus Allii (20 per cent.) . . . . . 1.90-3.75 Cc.  $3\frac{1}{2}$ -i.

#### ACTION.

Carminative, antiseptic, stimulant, irritant, expectorant, diaphoretic, diuretic.

#### USE.

This is a very unimportant therapeutic agent.

### SCILLA.

#### Squill.

The bulb of the *Urginea Maritima* (Nat. ord., *Liliaceæ*). This is inodorous ; taste mucilaginous, bitter, and acrid.

Habitat. Mediterranean coasts.

Chief constituents. Scillipicrin, scillitoxin (or scillain), and scillin.

**Scillipicrin** occurs as an amorphous, yellowish-white, very hygroscopic powder; very soluble.

**Scillain** (or scillitoxin) occurs as a colorless or yellowish, bulky powder, which forms a red solution with hydrochloric acid.

#### PREPARATIONS.

Scilla (powdered) . . . . .	0.06	-0.12	Gm.	gr. i-ij.
Extractum Scillæ Fluidum . . . . .	0.06	-0.12	Cc.	℥i-ij.
Acetum Scillæ (10 per cent.) . . . . .	0.30	-1.25	Cc.	℥v-xx.
Tinctura Scillæ (15 per cent.) . . . . .	0.30	-1.25	Cc.	℥v-xx.
Syrupus Scillæ (acetum 45 per cent.) . . . . .	0.95	-3.75	Cc.	℥xv-zi.
Syrupus Scillæ Compositus . . . . .	0.30	-1.25	Cc.	℥v-xx.
Φ Scillain . . . . .	0.001-0.002		Gm.	gr. $\frac{1}{80}$ - $\frac{1}{40}$ .
Φ Scillipicrin . . . . .	0.001-0.002		Gm.	gr. $\frac{1}{80}$ - $\frac{1}{40}$ .

**Syrupus Scillæ Compositus** (Hive syrup) contains fluid extract of squill 8, fluid extract of senega 8, and tartar emetic  $\frac{1}{5}$  part in 100 parts.

#### ACTION.

Squill has an irritant action causing nausea and vomiting, through its influence on the gastric mucous membrane; causing catharsis, and inflammation of the bowels when large doses are given. It acts as an irritant along the lines of elimination, causing increased secretion of urine; or, after a large dose, bloody urine, or suppression of urine. It causes increased secretion of the bronchial mucous membrane. Its action upon the heart and circulation resembles that of digitalis.

Scillain resembles digitalis in action, both on the heart and kidneys, hence the diuretic action of squill is due both to increased secretion, and to increased arterial tension.

The action of scillipicrin is not so well determined. It is said to be diuretic, and depressant to the heart's action.

#### USE.

In sub-acute or chronic bronchitis squills may be used as a stimulating expectorant. As such it is, however, an inferior remedy. It may be combined with digitalis in the treatment of organic heart disease, or in certain dropsical conditions. As a domestic remedy the compound syrup is used to produce nausea, or emesis, in the treatment of spasmodic croup.

#### TOXICOLOGY.

An over-dose of squill will cause not only nausea and vomiting, but purging, bloody stools, gastro-enteritis, dysuria, followed by suppression of



urine, acute nephritis, etc. There will also occur stupor and convulsions preceding death.

*Treatment.*—The free use of diluents, and of cardiac stimulants. Further treatment should be symptomatic.

### COLCHICI RADIX.

**Root of Colchicum.** Meadow saffron.

The corm of *Colchicum autumnale* (Nat. ord., *Liliaceæ*.) Inodorous; taste sweetish, bitter, and somewhat acrid.

Habitat. Europe, and Northern Africa.

Chief constituent. *Colchicin*,  $C_{17}H_{23}NO_6$ , which is an amorphous powder, of a light-yellow color, with a faint odor, and an intensely bitter taste. Soluble in water and alcohol; sparingly soluble in ether.

### PREPARATIONS.

Extractum Colchici Radicis . . . . . 0.03–0.12 Gm. gr.  $\frac{1}{2}$ –ij.

Extractum Colchici Radicis Fluidum . 0.12–0.30 Cc. ℥ij–v.

Vinum Colchici Radicis (40 per cent.) . 0.60–1.90 Cc. ℥x–xxx.

∅ Colchicin . . . . . 0.0005–0.001 Gm. gr.  $\frac{1}{120}$ – $\frac{1}{36}$ .

### ACTION.

Colchicum acts as an irritant in the alimentary canal, causing nausea, vomiting, and purging when given in full doses. By its action on the liver it increases the secretion of bile. It increases the action of the sweat glands. It is supposed to have some action on the kidneys, but the nature of such action, if any exists, is not understood. Large doses cause paralysis of the peripheral sensory nerves, and of the spinal cord. The motor nerves are not affected.

### USE.

Colchicum is almost a specific in the treatment of gout. It is also used in chronic rheumatic arthritis.

### TOXICOLOGY.

The symptoms of poisoning are, nausea and vomiting, purging with mucous and bloody stools, marked abdominal pain, and tenesmus. Death results from exhaustion, or paralysis of the respiratory centre, or of the heart.

*Treatment.*—This consists in the free use of demulcents, and of cardiac and respiratory stimulants, hypodermatically. Other treatment should be symptomatic.

### COLCHICI SEMEN.

**Seeds of Colchicum.**

The seeds of *Colchicum autumnale* (Nat. ord., *Liliaceæ*.) Inodorous; taste bitter, and somewhat acrid.

## PREPARATIONS.

Extractum Colchici Seminis Fluidum . . 0.12-0.30 Cc. ℥ ij-v.  
 Tinctura Colchici Seminis (15 per cent.) . 0.90-1.90 Cc. ℥ xv-xxx.  
 Vinum Colchici Seminis (15 per cent.) . 0.90-1.90 Cc. ℥ xv-xxx.

## ACTION, USE AND TOXICOLOGY.

The same as for the root of colchicum. See p. 360.

## ALOE BARBADENSIS.

**Barbadoes Aloes.**

The inspissated juice of the leaves of *Aloe vera* (Nat. ord. *Liliaceæ*). This occurs in hard, orange-brown masses, having a saffron-like odor, and a bitter taste.

Habitat. Barbadoes.

Chief constituent. Aloin (known as barbaloin).

## ACTION AND USE.

The same as that of purified aloes. See p. 362.

## ALOE SOCOTRINA.

**Socotrine Aloes.**

The inspissated juice of the leaves of *Aloe Perryi* (Nat. ord. *Liliaceæ*). This occurs in hard, yellowish-brown masses, having a saffron-like odor, and a bitter taste.

Habitat. Socotra.

Chief constituent. Aloin (known as socaloin).

## PREPARATION.

Extractum Aloes . . . . . 0.03-0.30 Gm. gr.  $\frac{1}{2}$ -v.

## ACTION AND USE.

The same as that of purified aloes. See p. 362.

## ALOE PURIFICATA.

**Purified Aloes.**

This is obtained from socotrine aloes, by treating it with alcohol to free the drug of leaves, wood, stones, pieces of skin, and other extraneous matters which are always present in the crude aloes. The product is in irregular, brittle pieces of a dull brown or reddish-brown color, having the characteristic odor of socotrine aloes.

## PREPARATIONS.

## Extractum Colocynthis Com-

positum (50 per cent.) . 0.12-0.30 Gm. gr. ij-v.

Pilulæ Aloes . . . . . 1 = .13 Gm. gr. ij.

Pilulæ Aloes et Asafœtidæ . . . . . 1 = .09 Gm. gr. 1½.

Pilulæ Aloes et Ferri . . . . . 1 = .07 Gm. gr. i.

Pilulæ Aloes et Mastiches . . . . . 1 = .13 Gm. gr. ij.

Pilulæ Aloes et Myrrhæ . . . . . 1 = .13 Gm. gr. ij.

Pilulæ Rhei Compositæ . . . . . 1 = .10 Gm. gr. 1½.

Tinctura Aloes (10 per cent.) . . . . . 1.90-7.50 Cc. 3½-ij.

Tinctura Aloes et Myrrhæ (10 per cent.) . 1.90-7 50 Cc. 3½-ij.

Tinctura Benzoini Composita (2 per cent.) . 0.60-1.90 Cc. ℥x-xxx.

## ACTION.

Through its bitter properties aloes increases the secretion of bile; also the gastric, and intestinal secretion. In the presence of bile it is a slow-acting purgative, affecting chiefly the lower part of the bowel. It cause some irritation in the lower bowel and tends to produce congestion of the pelvic organs.

## USE.

As shown by the official preparations, aloes is seldom used alone. It is combined with other laxatives to secure action upon the lower part of the bowel. It is combined with iron for use in amenorrhœa, the action of the aloes tending to cause congestion of the pelvic organs, and thus helping to restore normal menstruation.

## ALOINUM.

## Aloin.

This is a neutral principle obtained from several species of aloes, chiefly Barbadoes aloes (yielding Barbaloin), and Socotrine aloes (yielding Socaloin), differing more or less in chemical composition and physical properties according to the source from which it is derived. It occurs in minute, acicular crystals, or as a micro-crystalline powder, varying in color from yellow to yellowish-brown; odorless, or possessing a slight odor of aloes, with a characteristic, bitter taste, and a neutral reaction. Soluble, at 15° C., in about 60 parts of water, and in 20 to 30 parts of alcohol.

Dose: 0.01-0.12 Gm. gr. ⅙-ij.

## ACTION.

As this is the active principle of aloes, its action is the same as that described under purified aloes.

## USE.

Aloin is seldom used alone. It is a common ingredient in pills used in the treatment of chronic constipation.

## CALAMUS.

**Sweet Flag.**

The rhizome of *Acorus Calamus* (Nat. ord., *Aroideæ*).

It has an aromatic odor, and a strong, pungent taste.

Habitat. North America, Europe, and Asia.

Chief constituents. A volatile oil, and a bitter principle.

## PREPARATIONS.

Extractum Calami Fluidum . . . . . 0.30-0.95 Cc. M<sub>v</sub>-xv.

## ACTION.

Carminative.

## USE.

This is an unimportant therapeutic agent. It may be used to relieve flatulence.

## TRITICUM.

**Couch Grass.**

The rhizome of *Agropyrum repens* (Nat. ord., *Gramineæ*), gathered in the spring, and deprived of its rootlets. This is inodorous, with a sweetish taste.

Habitat. Europe. North America.

Chief constituents. Triticin, and sugar.

## PREPARATIONS.

Extractum Tritici Fluidum . . . . . 3.75-7.50 Cc. ʒi-ij.

## ACTION.

Diuretic, demulcent.

## USE.

Triticum has been pushed upon the market, of late, as a useful diuretic in acute inflammatory diseases of the urinary tract.

SACCHARUM.  $C_{12}H_{22}O_{11}$ .**Cane Sugar.**

The refined sugar obtained from *Saccharum officinarum* and from various species or varieties of *Sorghum* (Nat. ord., *Gramineæ*), also from one or more varieties of *Beta vulgaris* (Nat. ord., *Chenopodiaceæ*).

It is odorless and has a sweetish taste.

## ACTION.

Nutritive, diuretic, laxative.

## USE.

It is used pharmaceutically, in making syrups, etc.

## ZEA.

**Corn Silk.**

The styles and stygmata of *Zea mays* (Nat. ord., *Gramineæ*).

Inodorous; taste sweetish.

Habitat. Tropical, and Subtropical America.

Chief constituent. Maizenic acid.

## PREPARATION.

Extractum Zeæ Fluidum . . . . . 1.90–3.75 Gm. ʒss–j

## ACTION.

Diuretic, demulcent.

## USE.

It may be used when diuretics are required in acute inflammatory diseases of the urinary tract.

## AMYLUM.

**Starch.**

The fecula of the seed of *Zea Mays* (Nat. ord. *Gramineæ*). It occurs in irregular, angular masses, which are easily reduced to a fine powder. White, inodorous and tasteless; insoluble in alcohol, or cold water. When boiled with water it yields a white jelly.

*Composition*.—This is a carbohydrate. Its composition is  $C_6H_{10}O_5$ . By hydrolysis it is converted into a gummy principle, dextrine and glucose; by fermentation it is converted into alcohol and carbon-dioxide.

## PREPARATION.

Glyceritum Amyli (10 per cent.) . . . . . For external use.

## ACTION.

Nutritive, demulcent.

## USE.

Externally, starch is used as a protectant dusting powder, and as a vehicle for drugs to be used as dusting powders, in certain skin diseases, etc. By enema it is used for its soothing, and protectant action, in the treatment of dysentery, etc.

## OTHER STARCHES.

**Avena Farina.** Oatmeal. A grayish-white meal.

**Sago.** Pearl Sago. From the East Indies. Pearl-like grains, light or brownish.



**Tapioca.** Cassava Starch. From South America. White, irregular lumps.

**Arrow-root.** From the West Indies. A white powder, or small, pulverulent masses.

#### LYCOPODIUM.

The spores of the *lycopodium clavatum* (Nat. ord., *Lycopodiaceæ*).

This is, as a fine powder, pale-yellowish, very mobile; inodorous, tasteless, floating upon the water and not wetted by it, and burning quickly when thrown into a flame.

Habitat. North America, Europe, and Asia.

Chief constituents. A fixed, and volatile oils.

#### ACTION.

A protective, and non-adhesive.

#### USE.

It may be used as a dusting powder, on excoriated surfaces.

#### ASPIDIUM.

**Male Fern.** Filix Mas.

The rhizome of *Dryopteris Filix-mas* and of *Dryopteris marginalis* (Nat. ord., *Filices*). It has a slight but disagreeable odor; the taste is sweetish, acrid, and nauseous.

Habitat. United States, Europe, Asia.

Chief constituents. Filicic acid, fixed and volatile oils, resins, and tannic acid.

#### PREPARATION.

Oleoresina Aspidii . . . . . 1.90–3.75 Cc.  $3\frac{1}{2}$ -j.

#### ACTION.

That of an anthelmintic.

#### USE.

This, while a disagreeable drug to take, is one of the most efficient in use, to cause the expulsion of tapeworm from the intestinal canal.

#### ERGOTA.

**Ergot.**

The Sclerotium of *Cleviceps purpureæ* (Nat. ord., *Fungi, Ascomycetes*), replacing the grain of rye. *Secale cereale*. The odor is heavy, and unpleasant; the taste oily, and disagreeable.

Ergot should be only moderately dried. It should be preserved in a close vessel, and a few drops of chloroform should be dropped upon it from time to time to prevent the development of insects. More than one year old it is unfit for use.

**Habitat.** In the inflorescence of *Secale cereale*, and other grasses.  
**Chief constituents.** Not well determined.

#### PREPARATIONS.

Extractum Ergotæ . . . . .	0.30-1.25 Gm. gr. v-xx
Extractum Ergotæ Fluidum . . . . .	0.60-3.75 Cc. ℥x-ʒi
Vinum Ergotæ (15 per cent.) . . . . .	3.75-7.50 Cc. ʒi.-ij
Φ Ergotin . . . . .	0.12-0.30 Gm. gr. ij-v

#### ACTION.

The action of ergot, through the nervous system, causes contraction of involuntary muscular fibres throughout the body—contraction of arteries and of the arterioles; contraction of the uterus; contraction of the bladder; contraction of the intestinal muscular coat, etc. Through contraction of the arterioles ergot tends to arrest hemorrhage from these vessels; to diminish chronic congestion of the spinal cord, etc. Through contraction of the uterus it causes expulsion of the uterine contents, or, in case of uterine fibroids, it impairs the nutrition of these abnormal growths and tends to reduce their size or to cause their destruction. Through contraction of the bladder it may overcome incontinence of urine, or retention of urine due to atony of the muscular coat of this organ. Through contraction of the intestinal muscular coat it may relieve chronic constipation. Through its combined action upon the intestinal muscular coat, and upon the arterial system, it may relieve certain forms of diarrhœa. There is increased blood-pressure, due in part to the action of ergot upon the arterial walls, in part to contraction of the internal viscera. There is slowing of the heart's action through stimulation of its inhibitory apparatus. There may be paralysis, or convulsions, due to impaired nutrition of the nervous system, the result of arterial contraction.

The long-continued use of ergot may give rise to *ergotism*. Of this there are two forms, (1) the gangrenous, (2) the convulsive form. The first is due to the persistent arterial contraction interfering with the nutrition of a part. The second is due to the persistent arterial contraction interfering with the nutrition of nervous centres.

The uterine contractions are clonic after small doses, tonic after large doses.

#### USE.

Ergot may be used to arrest hemorrhages from small vessels; to arrest, or prevent post-partum hemorrhage, or to arrest hemorrhage in the treatment of menorrhagia.

It may be used to aid in the expulsion of the fœtus when there is deficient uterine contraction *provided* the os is fully dilated and there is no ob-

struction to rapid delivery. It may be used to cause the reduction in size, or expulsion, of uterine fibroids.

It may be used to control incontinence, or retention, of urine when due to atony, or reflex paralysis of the bladder. It may be used in chronic congestion, or chronic inflammation of the spinal cord, or its meninges.

#### TOXICOLOGY.

This is not apt to follow the therapeutic use of the drug, but in certain European countries the accidental presence of ergot in the bread may cause *ergotism*. As already stated, there are two forms of ergotism: (1) the gangrenous; (2) the convulsive form. The symptoms of the gangrenous form are those of ordinary dry gangrene, viz.: the part takes on a dark hue and becomes cold; there may be symptoms of local inflammation with intense pain in the part, the pain subsiding when the gangrene becomes complete; or the part may shrivel up without any local signs of inflammation.

The symptoms of the convulsive form of ergotism are those of irritation and paralysis of sensory nerves, viz., itching, tingling, and formication; sensation of numbness and local anæsthesia, followed by tonic muscular contractions throughout the extremities.

*Treatment*.—Stop the supply of ergot, and treat symptoms.

#### Φ USTILAGO.

**Corn-smut.** Corn-ergot.

A fungus growth, the *Ustilago maydis* (Nat. ord. *Fungi*, *Æcidiumycetes*), upon *Zea mays*, more particularly upon the inflorescence.

It has a disagreeable odor and taste.

It consists of blackish, irregular, roundish masses, enveloping innumerable spores.

Dose: 0.95–1.90 Gm. gr. xv–xxx.

#### ACTION.

The same as that of ergot. See p. 366.

#### USE.

It may be used as a substitute for ergot.

#### Φ AGARICUS ALBUS.

**White Agaric.** Touchwood. Spunk. Tinder. Purging agaric.

The fungus *Polyporus officinalis* (Nat. ord. *Fungi*, *Hymenomycetes*).

Habitat. Asia, and Europe (on the larch).

Chief constituent. Agaricin.

Φ **AGARICINUM.**  $C_{16}H_{30}O_5, H_2O$ .

**Agaricin.**

This is a white, lustrous powder; sparingly soluble in cold water; soluble in 10 parts of warm water.

Dose: 0.02–0.03 Gm. gr.  $\frac{1}{3}$ – $\frac{1}{2}$ .

**ACTION.**

The action of agaricin is not fully determined. It checks the sweating which accompanies wasting diseases, as well as that due to the use of the synthetical antipyretics.

**USE.**

It may be used to check abnormal sweating.

**FUNGUS MUSCARIUS.**

**Fly Fungus.**

The fungus *Agaricus Muscarius* (Nat. ord. *Fungi*, *Hymenomycetes*).

Habitat. Europe.

Chief constituent. Muscarine.

Φ **MUSCARINUM.**  $C_5H_{15}NO_3$ .

**Muscarine.**

This is a hygroscopic, crystalline substance, soluble in water and in alcohol.

Dose: (Muscarinæ Nitras) 0.02–0.03 Gm. gr.  $\frac{1}{3}$ – $\frac{1}{2}$ .

**ACTION.**

Muscarine resembles physostigmine in its action upon unstripped muscular fibres, and upon secretion. It is a powerful poison, and a physiological antidote to atropine.

**USE.**

It may be used to check the sweating due to debility. It may be of possible benefit in pulmonary congestion, or pulmonary hemorrhages. It may be used as an adjunct in the treatment of chronic constipation.

**CETRARIA.**

**Iceland Moss.**

The entire lichen *Cetraria islandica* (Nat. ord., *Lichenes*).

It is long, foliaceous, irregularly branched into fringed and channelled lobes, brownish above, whitish beneath, and marked with small depressed spots; brittle and odorless; when softened in water, cartilaginous, and having a slight odor; its taste is mucilaginous and bitter.

Habitat. The Northern Hemisphere.

Chief constituents. Lichenin and isolichenin, cetraric acid, etc.

## PREPARATION.

Decoctum Cetrariæ . . . . . 15.00-60.00 Cc.  $\frac{3}{2}$ -ij.

## ACTION.

Demulcent, nutritive, tonic.

## USE.

It may be used as a nutrient when digestion is weak. It may also be used as a demulcent in diseases of the pharynx, or larynx, or of the intestinal canal.

## CHONDRUS.

**Irish Moss.** Carragheen.

The *Chondrus crispus* and *Chondrus mammilosus* (Nat. ord., *Algæ*).

It is yellowish or white, horny, translucent; many times forked; when softened in water, cartilaginous. It has a slight sea-weed odor, and a mucilaginous, somewhat saline taste.

Habitat. Atlantic Ocean.

Chief constituents. Mucilaginous compounds, with traces of bromides, iodides, etc.

Dose: Ad libitum.

## ACTION.

Demulcent, nutrient, tonic.

## USE.

Irish moss is used as a food when other food cannot be borne. It is also used as a demulcent in irritable states of the larynx, or of the intestinal canal.



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